COMPLIANCE PLUS SERVICES, INC.

November 18, 2016

Via Electronic Mail & UPS Ground Delivery

Mindy Anthony
Department of Natural Resources and Environmental Control
Division of Waste & Hazardous Substances
89 Kings Highway
Dover, DE 19901

RE: Response to November 10, 2016 Electronic Comments Regarding Response to Risk Assessment Evaluation Comments and Submission of Revised Permit Renewal Documents for Clean Earth of New Castle, LLC ("CENC"), 94 Pyles Lane, New Castle, DE 19720; Resource Recovery Permit No. SW-02b16

Dear Ms. Anthony;

Pursuant to your November 10, 2016 electronic mail (e-mail), Compliance Plus Services, Inc. ("CPS") is submitting the enclosed revised portions, or sections, of the Resource Recovery Permit renewal application (Permit No. SW-02b16) on behalf of our client, Clean Earth of New Castle, LLC ("CENC"). These final revisions to the application documents are intended to replace, in total, the amended information that CPS submitted to the Department on behalf of CENC on November 4, 2016.

CENC has used the revised risk assumption values suggested by the Department to complete its Risk Assessment Evaluation to establish alternative end use limits for the soil materials that are produces and sent offsite for use as alternative daily/intermediate cover ("ADC") materials at Delaware Landfills. We appreciate the Department's hard work and diligence in helping us to establish the values to finalize the ADC use limits.

If you have any question regarding this submission or our response to comments please feel to contact me at 215.734.1414 or via electronic mail at mlogan@cps-2comply.com.

Sincerely,

Michael D. Logan
Vice President, Environmental Services
Compliance Plus Services, Inc.
Corporate Consultant to the Clean Earth Companies
Enclosure

cc: Nancy Marker, DNREC
Jason Sunde, DNREC
Bill Miller, DNREC
Averil Rance, Clean Earth, Inc.
Paul Lane, Clean Earth of New Castle, LLC
Lynsey B. Kocenko, DSWA, Cherry Island Landfill (transmittal and response only)

N:\LETTERS\5700-5799\5734 - CENC - Response to 11-10-16 Risk Assessment Comments and Submission of Rev. Permit Renewal Documents .docx

Response to Resource Recovery Permit Renewal
November 18, 2016

Table of Contents

General Operations Plan for Thermal Remediation and Recovery of Petroleum Hydrocarbon Contaminated Soil

Section 4

General Operations Plan –
Thermal Remediation and Recovery of
Petroleum Hydrocarbon Contaminated Soils

General Operations Plan – Thermal Remediation and Recovery of Petroleum Hydrocarbon Contaminated Soils

Clean Earth of New Castle, LLC
94 Pyles Lane, New Castle, Delaware 19720

November 2016
Document Control Number: CEI-212-004 (Rev7, 08/15)

Prepared by:
Compliance Plus Services, Inc.

P.O. Box 186
Hatboro, PA 19040-0186
(215) 734-1414

Project Number: 0150.0799.02

Table of Contents

Tables

Appendices

Supplemental Resource Recovery Operations

1.0 Facility Overview

1.1 General Overview of Operations

This General Operations Plan (GOP) has been prepared to describe the soil remediation and resource recovery operations conducted at Clean Earth of New Castle (CENC) as part of an application for continued operation under a renewal and modification of CENC's Resource Recovery Facility Permit. CENC currently conducts operations under a DNREC issued Resource Recovery Permit SW-02b16. CENC operations must be consistent with both the authority granted by the Delaware Department of Natural Resources and Environmental Control (DNREC or Department) and the applicable provisions under Section 9 of the Delaware Regulations Governing Solid Waste (DRGSW).

CENC is currently permitted to process petroleum-contaminated soils in its state-of-the-art Soil Remediation Unit (SRU). The SRU, which includes a thermal treatment system, has been in operation since 1992 and has successfully remediated millions of tons of contaminated soil for beneficial reuse as intermediate and final landfill cover and/or structural fill and non-structural products. Section 2.1 describes the SRU operations in further detail.

For treatment in the SRU, CENC may accept non-RCRA hazardous soils contaminated with petroleum hydrocarbons and/or natural oils. Acceptable sources of contamination are restricted to those listed in Section 3.1.1 of this GOP.

In addition to the soils accepted for treatment in the SRU, CENC is currently permitted, and seeks to maintain its authorization, to accept:

1) Soils that already meet the chemical constituent requirements for reuse, without further treatment, which are managed as direct reuse soils (DRS); and
2) Specific non-hazardous recyclable materials (NHRM) for use primarily as soil amendments.

The NHRM may also be used by CENC to supplement or replace potable water utilized in the SRU to cool and rehydrate thermally treated soils. While the process of adding NHRMs to remediate soils to improve their reuse has previously been approved, the

sampling frequency and analytical parameters required to accept a specific NHRM must be approved for the each category or class of NHRM by the Department on a case-by-case basis. CENC may not accept any NHRM at the facility until after the Department has granted written approval. The management of DRS soils and NHRM materials are both further explained in the supplemental Operating Modules as referenced in Section 1.3 below.

This renewal application also includes the following proposed modifications to the current General Operations Plan and associated Operating Modules:

- This application proposes the use of an additional treatment technology to remediate petroleum contaminated soils using micbrobial digestion via the use of specialized biotreatment reagents. This biological treatment (or bioremediation) will occur within the confines of the currently permitted facility and is described in further detail in new Operating Module 3. Soils destined for this biological treatment process are referenced herein as biological remediation soils (BRS).

- CENC is also seeking approval to modify the facility's soil testing and acceptance criteria as specified in Table 3-1. These changes are relatively minor and comprise the items listed below.

    - The tables have been modified to change the acceptance and reuse limit for PCBs. Specifically the PCB limit has been changed to 3 mg/kg to match the Delaware Landfill Reuse Limit. Alternatively, the PCB limit would match the approved end use criteria for beneficial use consistent with the requirements specified in Section 3.4 below;
    - There are proposed changes in the minimum testing requirements for incoming soils to be more reflective of the regulatory determinations required to be confirmed by the facility.

CENC has developed this General Operations Plan to describe the procedures, processes and overall management that must be implemented and utilized by the facility to conduct its permitted recycling/recovery operations.

1.2 Site Location

The CENC facility is located at 94 Pyles Lane, New Castle, DE, 19720. The facility comprises approximately 7.5 acres located in a heavily industrialized area near the intersection of Interstate 495 and Terminal Avenue (Exit 2). The front gate of the facility

is located at the following coordinates (WGS 84):

Latitude: N 37.71566° Longitude: W 75.53874°

A site plan, Drawing No. SP-01, prepared by Compliance Plus Services, Inc. (August 24, 2015) is included in Appendix I. In addition, a site location map and topographic map are included in Appendix I which shows the area surrounding the current facility. The property includes New Castle County Tax Parcels 1000600011, 1000600012, 1000600013, and 1000600015.

1.3 Operating Modules For Supplemental Resource Recovery Operations

In addition to this GOP, two additional Operating Modules are included with this Plan to detail the procedures related to the supplemental resource recovery operations conducted at CENC. A summary description of these operating modules is provided below.

1.3.1 Operating Module 1 – Management Procedures for Direct Reuse Soils ("DRS Soils") (last revised February 2015)

Operating Module 1 details the procedures that will be utilized by the facility to accept and utilize soils that already do not require thermal or biological remediation to reduce petroleum hydrocarbon compounds prior to reuse. These DRS Soils may only require physical processing at CENC prior to its end use. These DRS Soils are intended to supplement the materials produced utilizing the thermal and biological remediation processes at the facility and to augment CENC's production of treated soils (particularly the production of landfill cover materials) to meet an increasing demand and stabilize the facility's inventory. In addition, utilizing DRS soils at CENC allows the facility to source separate and reclaims other aggregate products (such as rock, concrete, etc.) and scrap metal material for further recycling/reuse.

1.3.2 Operating Module 2 – Management Procedures for Non-Hazardous Recyclable Materials (NHRM) (last revised April 2010)

Operating Module 2 defines the processes employed at the CENC to beneficially use various types of NHRM that would otherwise be disposed of as wastes.

CENC is permitted to use these NHRMs in place of potable water to cool and rehydrate the soil exiting the SRU unit to conserve natural resources, and provide an environmental benefit to the State of Delaware and the surrounding communities. In addition, the process of integrating these NHRM into the thermally treated soil restores nutrients and other organic content to produce a synthetic soil and improves the soil for additional reuses.

1.3.3 Operating Module 3 – Management Procedures for Biological Remediation Soil (BRS) Contaminated with Petroleum Hydrocarbons

Operating Module 3 describes the procedures that will be utilized to accept, process, treat and reuse BRS. This enhanced biological remediation treatment process utilizes specifically selected microorganisms that are capable of metabolizing the organic constituents that compromise the petroleum contaminants.

Once the microbial digestion of the petroleum hydrocarbons is complete, the soils are tested to demonstrate that the biological process reduced the petroleum hydrocarbons to acceptable levels for reuse.

1.4 Equipment

A detailed list of the operating and processing equipment that is used at the CENC facility to conduct the activities detailed in this General Operations Plan and its supplemental operating modules is provided in Table 1-4. The specific equipment identified may be replaced, in kind as needed, by equipment that provides the same or equivalent function in the event of a mechanical malfunction, intermittent maintenance or service interruption or when the unit has exceeded its useful service life. All equipment will be properly maintained and serviced as recommended by the manufacturer or authorized supplier. In addition, the equipment will be inspected and monitored for service as described in Section 4.0 below.

1.5 Health, Safety, and Employee Training

All CENC employees will work under appropriate health and safety guidelines established by the Occupational Safety and Health Administration (OSHA). Use of personal protective equipment will be in accordance with 29 CFR 1910.132 as a minimum. First aid equipment must be maintained and available onsite. Emergency telephone numbers

of nearby ambulance, hospital, police and fire services will be prominently displayed onsite. Any confined space entry done by employees or contractors shall be done in accordance with 29 CFR 1910.146.

All employees who are required to utilize equipment for the proper operation of the facility will be appropriately trained in the operation and maintenance of the equipment prior to using it. CENC will maintain documentation of any required training provided at the facility. Training will include, at a minimum, the following documentation of employee information:

- The name of the employee receiving training;
- The name of the trainer or qualified instructor;
- A brief description of training provided;
- The date the training was completed; and
- A signature of the employee documenting attendance.

An example of a form that will be used by CENC to document and record training for employees is provided in Appendix II. This documentation of training will be maintained for three (3) years and made immediately available for DNREC review upon request.

In addition to the equipment training, the CENC training program is also designed to ensure that certain facility personnel are properly trained with the knowledge to effectively respond to emergency situations. These employees are shown the location of emergency equipment, such as fire extinguishers, absorbent materials, first aid supplies, etc. and are given appropriate instruction on the equipment use. Employees are also informed of the recognition of and proper handling procedures for waste materials that may have potentially harmful effects.

All new employees receive training that consists of a plant tour of process operations, followed by a hands-on training period in the area where the employee will work. All employee training will be provided by the Facility Manager, or his designee.

1.6 Control of Fugitive Dust

CENC uses a street sweeper and/or water spray truck to control fugitive dust generated by truck traffic and general facility operations. The street sweeper and/or water spray truck are to be used at least once each operating day, as weather conditions permit, on all paved surfaces, including Pyles Lane. This will be done more often in the event of

sustained airborne visible dust. Additionally, a street sweeper and/or water spray truck must be used whenever truck traffic starts to generate visible fugitive dust.

CENC personnel will complete fugitive dust control application logs. At a minimum, these logs must include the date, activity performed (i.e. ran street sweeper), run time, locations in which activity was performed in addition to a section for employee comment. Completed logs are required to be maintained at the facility for a minimum for five (5) years and made immediately available for DNREC review upon request.

1.7 Applicable Permits

CENC operates, and seeks to continue to operate, the Soil Remediation Unit and associated processes/equipment under the authority granted by the DNREC. Current permits include the following:

- Resource Recovery Permit No. SW-02b16
- Air Quality Permit No. AQM- 003/00290 (Renewal 1)
- NPDES Storm Water General Permit

2.0 Petroleum Contaminated Soil Process

CENC's current Resource Recovery permit, for which it seeks reissuance, allows soils, and other environmentally inert solid materials, such as rock, gravel, concrete, etc., contaminated with petroleum hydrocarbons, as specified in Section 3.1.1 to be processed via thermal treatment as discussed herein. In addition to thermal processing in the SRU, the plant is equipped to physically process soil by screening and blending prior to thermal or biological treatment. Blending of unremediated soils may only be performed to achieve the physical characteristics (e.g., moisture content) necessary for proper treatment or to reduce or adjust the TPH concentration to facilitate the thermal desorption process. The facility is also designed to conduct certain supplemental resource recovery operations such as:

1) management of Direct Reuse Soils, as described in Operating Module 1, (which are soils that are to be physically processed only and do not require thermal treatment if being used as alternate daily or intermediate landfill cover or another use specifically authorized by the Department);
2) the use and handling of NHRM materials, as described in Operating Module 2, that are used to cool and rehydrate soils exiting the SRU and may also be used to replace organic content and nutrients to the soil that were destroyed during the thermal treatment process: and
3) the use and application of microbial agents specifically engineered to biologically remediate soil, reducing petroleum contaminants to levels required for reuse as described in Operating Module 3.

All post-processing analytical requirements must be met before the soil can be sent offsite for reuse. The processed soils generated by CENC can be beneficially reused for a variety of purposes as described in Section 2.6 below. The processes described below are also depicted in the CENC Soil Management and Process Flow Diagram included in Appendix XI.

2.1 Soil Remediation Unit

At its current permitted capacity, the thermal desorption unit can process an average of approximately 60 tons per hour (T/H) of contaminated material. The thermal processing system is permitted to operate 24 hours per day, 7 days per week, with a maximum of 6,000 operating hours per year, or as specifically authorized under the facility's Air Quality Permit issued by the Department. The operating schedule typically allows one hour each for start-up and shut down of the thermal processing system.

The media containing the contaminants will be a non-combustible material (e.g., soil). The contaminants contained in the media will typically have combustion temperatures ranging between 230° F and 1100° F. No ignitable materials (flashpoint < 140 °F) will be accepted at the site. Acceptance is defined as the point the soils are off-loaded at Clean Earth of New Castle's facility.

The components of the residual waste thermal processing system include:

- Rotary drum soil dryer with primary burner (specifically, a Thermotech Soil; Desorption Unit);
- Cyclone
- Primary baghouse
- Primary fan
- Heat exchanger
- Thermal oxidizer
- Exhaust stack
- Mixing & soil cooling conditioners
- Secondary baghouse
- Auxiliary fan

The primary treatment component is the rotary dryer. This dryer measures approximately 10 feet in diameter by 48 feet long. Contaminated soils enter the rotating dryer, which is heated with a burner fueled with natural gas or on-specification recycled fuel oil, and exits the opposite end of the rotary dryer as remediated soil. A 48 million BTU per hour (mmBtu/hr) burner (maximum) provides heat to the rotary dryer. A secondary burner (17 mmBtu/hr) provides heat in the thermal oxidizer unit. Waste material moves in one direction through the dryer while air flows in the opposite direction. The dryer heats contaminated soils to temperatures between 230 and 1,100°F. The waste is retained in the dryer for approximately 12 to 15 minutes depending on the concentration and type of petroleum contaminants as well as the type of soil matrix itself. As the soil is heated, hydrocarbons volatilize into the dryer exhaust gas air stream. Following the retention period, the processed material is discharged from the dryer.

The dryer exhaust flue gas is ducted to the thermal oxidizer that operates at a temperature to ensure final destruction of the hydrocarbon-laden gases. The thermal oxidizer will destroy 99% or greater of these hydrocarbons and is regulated under the facility's air permit. A natural gas burner provides heat to the thermal oxidizer.

Particulate matter is collected in the bag house equipped with Teflon coated fiberglass bags. CENC conducts visual observations of the stack to ensure compliance with the air permit requirements for the stack. Prior to disposal of spent bags from the baghouse, CENC must obtain a representative sample of the bags and their contents, as outlined in the facility's Ash Disposal Plan, for analysis of appropriate constituents. At a minimum, the testing will include TCLP metals and PCBs, in addition to any requirements of the disposal facility, to ensure proper disposal. A copy of these data will be maintained for at least three (3) years and made immediately available for DNREC review upon request.

Cooling is accomplished using an air-cooled heat exchanger. The air-cooled heat exchanger re-heats the air coming out of the baghouse to 800-900°F prior to entering the oxidizer for fuel efficiency. The heat exchanger and baghouse are both regulated via a DNREC issued air permit.

Automatic safety controls, temperature gauges, and recording devices allow the plant to operate only within strict parameter ranges. A computerized operating system controls the monitoring, collection and retention of data, and analysis of plant performance. These records will be maintained for at least three (3) years and made immediately available to DNREC for review upon request.

2.2 Material Acceptance

Trucks typically carrying 20 to 25 tons of material enter the facility by way of Pyles Lane. To minimize tracking of mud/dust onto Pyles Lane, CENC maintains water trucks and/or sweepers to clean the roadways inside the facility and on Pyles Lane as needed (Section 1.6).

2.2.1 Truck Entry Documents

Each truck delivering soil or non-hazardous recyclable materials to the facility must be accompanied by a CENC Site Entry Ticket. This Ticket or entry document bears an approval number, issued by CENC, to document that the material meets the analytical requirements to be accepted under the facility's operating permits. Additionally, each truck must have a valid Delaware Solid Waste Transporters permit. Upon arrival, and after entering the facility property, each truck will remove its tarp and advance to the onsite scales. The scale operator or other trained CENC personnel will verify the approval number on the entry ticket and Waste Transporter number, based upon the number generated by the computer tracking system, and logs in the truck. CENC verifies

with the Department that each waste-carrying vehicle that arrives at the facility is registered under a valid Waste Transporter Number.

2.2.2 Visual Inspection/Load Rejection

Each load is visually inspected when the truck is on the scale by trained CENC personnel. A representative composite sample of the soil in the truck is collected and analyzed as described in Section 3.3 below. If the load does not meet the acceptance criteria, CENC will contact the generator if any material is found that does not conform to the approval to resolve any discrepancies and if necessary reject the shipment. CENC will notify the SHWMB within 24 hours of any shipment being rejected. If, after acceptance, CENC determines the contaminated soils are unacceptable, CENC must notify the SHWMB immediately with the reason for rejection and the soil will be removed from the CENC facility within 72 hours unless otherwise authorized by the Department.

If the contaminated soil is determined to be a hazardous waste, CENC shall contact the SHWMB immediately and remove the NHRM within 72 hours, unless otherwise authorized by the Department. All removal and disposal shall comply with all applicable sections of Delaware's Regulations Governing Hazardous Waste (DRGHW). A copy of the hazardous waste manifest used to represent the shipment offsite shall be submitted to the SHWMB and a copy shall be maintained by CENC onsite for three (3) years and made immediately available for DNREC review upon request.

The onsite analytical results will be retained with the analytical results produced by the off-site laboratory (pre-acceptance sampling results) and maintained at the CENC facility for three (3) years. These results will be made available for DNREC review immediately upon request.

2.3 Material Storage

2.3.1 Unprocessed Material Storage

A maximum of 16,000 tons of contaminated soil must be stored in one of three (3) metal buildings identified as "TPH Storage" on the Site Plan Drawing SP-01. Each building shall be completely roofed with walls intact. Each load of contaminated soil or NHRM may be stored for a maximum of 56 days from the day of receipt. CENC must be able to immediately demonstrate the length of time each load has been onsite and maintain this documentation for DNREC review for a minimum of three (3) years.

Unprocessed soil may be screened and prepared for processing in the SRU outside of a storage building; however, unprocessed soil, with the exception of DRS soil as described in Operating Module 1, may not be stored outside of a storage building when the facility is not open for operation.

Petroleum contaminated soil must be segregated from Manufactured Gas Plant (MGP) contaminated soils and NHRM. Blending of unremediated soils may only be performed to achieve the physical characteristics (e.g., moisture content) necessary for proper treatment or to reduce or adjust the TPH concentration to facilitate the thermal desorption process.

2.3.2 Processed Material

Soil remediated in the SRU may be stockpiled uncovered for up to three working days while awaiting confirmatory analytical results as described in Section 3.4. If the results indicate that the soils achieve the reuse standards, they may be stored uncovered. Thermally remediated soils will be stored in the Finished Pile Storage Area shown on Site Plan Drawing SP-01 (dated August 24, 2015). DRS soils must be stored as described in Section 2.2 of Operating Module 1. Likewise, treated BRS soils will be stored as described in Operating Module 3. The facility has a maximum total storage capacity of 25,000 tons for processed material (thermally remediated soils, biological remediation soils and direct reuse soils combined).

Soils that do not meet the TPH limits shall be reprocessed in the thermal desorption unit, resampled, and reanalyzed within three working days of receiving the initial lab results.

While awaiting retreatment, the soil must be covered with an impervious tarp or placed in one of the storage buildings identified as "TPH Storage" on the Site Plan in Section 10. Within 24 hours of receiving lab results revealing a second treatment failure, the SHWMB must be notified via telephone (302.739.9403) of the reason for the treatment failure and a plan to remedy the unsuccessfully remediated soils.

Except for those processed soils sent offsite for the reuses detailed in Section 2.6 below, CENC will request, in writing, permission from DNREC to store remediated soil in any location other than that designated on the Site Plan. A letter from the property owner indicating they will assume liability for any contamination must be included in this request. Storage in any additional locations may only occur after written approval from the Department.

2.4 Process Description

After the truck has been logged in (see Section 2.2) and sampled (see Section 3.3), the driver is directed to a staging area pending analytical results. If the analysis indicates the material is acceptable, the truck is directed to the unloading area in the middle of the facility. After receiving the first four (4) loads of a project during the same operating day, CENC may allow drivers to unload prior to the completion of the pre-acceptance analysis required in Section 3.3 if the soils are from the same project and generator and none of the prior loads received from the soil project exceeded the facility's pre-acceptance analytical criteria. If soils are received from the same project on additional operating days, CENC may not unload the soils prior to receipt of the pre-acceptance analysis from the laboratory until at least four (4) loads from that project are received and the pre-acceptance analysis successfully demonstrates that the soil meets the facility's acceptance criteria. The soil is then transferred by CENC equipment (i.e. loaders, excavators) to one of the screening units to remove any residual aggregate material and/or debris. The screened soil is then transferred to one of three storage buildings designated as "TPH Storage" on the Site Plan revised December 22, 2009 to await treatment in the SRU. No unremediated soil (screened or unscreened), with the exception of DRS soils as described in Operating Module 1, will be stored in the unloading area or process area when the facility is not in operation. If the facility is closed the soils must be stored in one of three storage buildings, as described above.

Depending on the physical characteristics of the soil, such as the moisture content, and the amount of unprocessed and/or processed material already on site, treatment may not commence immediately. Each load of contaminated soil or NHRM may be stored for a maximum of 56 days from the date of receipt. The soil shall be stored in the storage buildings reverenced in Section 2.3.1 until treatment commences. At this time, the material may be commingled or combined with other soils to create a more treatable waste stream as described in Section 2.3.1.

Occasionally, incoming soils may be too wet (moisture content ranging from 10 to 30%) to effectively screen the soil before thermal processing. The high moisture content of these soils is generally due to weather conditions at the site where the soils are excavated or generated. In these instances, CENC may add any of the commercially available soil drying agents, as listed in Table 2-4, which includes sand, clay (speedi dry), vermiculite, cornstarch, diatomaceous earth, lime, lime kiln dust (LKD), cement kiln dust (CKD) or portland cement to the contaminated soils before screening to reduce the moisture content of the waste prior to further processing for thermal treatment. CENC

will maintain documentation at its site, in the form of an MSDS sheet or, for LKD and CKD, detailed chemical analysis, of the drying agents used to treat soils do not exceed facility acceptance limits specified in Table 3-1. If a new soil drying agent is identified, which is not listed in Table 2-4, CENC will submit a request for approval, in writing, to the Department prior to its use. This additional pre-treatment measure is not intended to alter the waste's chemical constituent levels, rather, the process is intended to improve the capability and efficiency of the final thermal treatment process.

Occasionally, during the biological remediation process, moisture can be generated. In this case soil drying agents may be added and mixed in with BRS soils to assure the material meets the geotechnical requirements of the end-use site.

CENC will limit the amount of soil drying agent added to the waste to a maximum of 7% by weight to avoid unintentional dilution of waste constituent concentrations. On average, 2-7% (by weight) of drying agents are required to reduce excess moisture content to 10% or below to make screening of the waste to remove oversized debris less difficult and more practical with the plant's existing equipment. Additionally, high moisture content creates inefficiencies in the thermal treatment process, resulting in unnecessary fuel usage and excess emissions from expending energy to remove water rather than treat contaminants.

The soil drying agents will be added to the soils while the material is in the designated TPH Storage Buildings. The drying agents are received at CENC in either packaged containers (e.g., bags, totes, etc.) or they may be supplied in bulk. The facility's Laboratory Manager, or his/her designee, will determine the amount of drying agent to add to the soil based on a bench-scale evaluation (the amount of drying agent added may not exceed 7% by weight of the contaminated soil to be processed, as indicated above). Additions will subsequently be made using a front-end loader bucket, or similar equipment, to spread the drying agent over the soil pile and then mixing the soil with the loader bucket. Based on the drying agents being used, no significant curing time is expected before the waste may be processed. CENC will monitor the amount of drying agent added to the soil and record the information in the facility's operating record. Again, this pre-treatment does not change the waste characteristics, but improves the capability of the waste treatment process.

CENC screens incoming soils using a vibratory deck screen to remove aggregate material (stone, brick, rock, concrete, asphalt, etc.), as well as process residuals such as paper, wood, plastic, and debris. Following the screening, CENC will hand sort or pick

any small debris or residuals from the remaining aggregate material to achieve final separation of the recyclable material.

The screening and physical separation process is to be conducted outdoors on the main asphalt paving area of the plant. This area is designed to provide appropriate management controls (e.g., stormwater runoff controls, including the use of a sedimentation basin) to prevent contaminated soil or leachate from being released to the environment.

Contaminated soil is transported to the SRU via a conveyor system. The soil enters the rotary dryer, where it is heated to a predetermined temperature range based on the type of contamination present in the soil (e.g., whether contamination present are light-end or gasoline range organic petroleum fractions, (GRO range compounds, typically boiling points less than 170°C), heavy-end or diesel range organic petroleum fractions (DRO range compounds, typically boiling points ≥170°C) or high PAH containing material such as MGP soils). All waste soils are heated to a temperature of between 230 to 1,100°F to volatize the hydrocarbon contamination. The initial temperature ranges typically used for each type of soil contaminant are as provided below:

Type of Contaminant	Soil Temperature Range (in °F)
GRO Petroleum Hydrocarbons (B.P. <170°C)	230-600
DRO Petroleum Hydrocarbons (B.P. ≥170°C)	350-850
MGP Contaminated Soils (High PAH soils)	400-1100

Generally, the soil is retained in the dryer for between 12-15 minutes, depending on the concentration and type of contamination, the physical characteristics, etc. Upon exiting the rotary dryer, the soil is considered clean, pending analysis (see Section 3.4).

The SRU is a robust treatment system that can process a wide range of soil/fill types (e.g., clays, sandy materials, high aggregate content, etc.) that contain varying concentrations of petroleum hydrocarbons. The maximum soil-charging rate may not exceed 60 tons per hour unless otherwise specified in the facility's Air Quality Permit. The actual soil-charging rate and combustion temperature are monitored at the facility's control tower by a trained and experienced plant operator. The operator may vary the feed rate and combustion temperature during the course of treatment depending on the physical characteristics, moisture content, and hydrocarbon concentration of the waste

stream. The burner temperature may vary from one batch to another in order to conserve natural gas while volatizing constituent concentrations to applicable soil re-use criteria.

A processed material conditioner (comprised of an auger with spray bars) controls dust emissions and rehydrates the processed material as it exits the dryer. The facility may supplement or replace the water used to rehydrate the soils exiting the dryer by using NHRM materials to add moisture content and bulk to cool the hot soils (see Operating Module 2 for more detailed discussions of the use and management of NHRM's). Any particulate matter (PM) or steam emissions from the secondary baghouse are returned to the dryer.

The cooled, moist, remediated soil is transferred to temporary outdoor storage piles using a radial stacker conveyor. A wet spray system is used to control fugitive dust during transfer to and from the piles during storage. Under normal operating conditions, a period of 22-25 minutes elapses from the time the contaminated soil is loaded onto the conveyor to when the remediated soil (pending analysis) exits the SRU via the radial stacker

At this time, the process of adding NHRM's to remediated soils to cool, rehydrate, and/or amend the remediated soil from the SRU has been approved by the Department. CENC may not accept any specific NHRM until after the Department has granted written approval (see the NHRM Operating Module).

The remediated material is sampled and may be stored uncovered for a period of three days, pending analytical results, as described in Section 2.3.2. Treated soils that achieve the required clean-up standard can remain uncovered and is transferred by front-loader from the storage piles onto outgoing trucks.

Soils that do not meet the reuse standards shall be reprocessed in the thermal desorption unit, resampled, and reanalyzed within three working days of receiving the initial lab results. While awaiting retreatment, the soil must be covered with an impervious tarp or placed in one of the storage buildings identified as "TPH Storage" on the Site Plan revised December 22, 2009. Within 24 hours of receiving lab results revealing a second treatment failure, the SHWMB must be notified via telephone (302.739.9403) of the reason for the treatment failure and a plan to remedy the unsuccessfully remediated soils.

2.5 Residual Materials Management

Aggregate material (stone, brick, block, asphalt, etc.) screened from the contaminated soil is initially stored in the Quonset Hut (or other acceptable building) until a verification is made to ensure that any petroleum soils have been sufficiently removed and separated from the aggregate. CENC will follow the standard operating procedures included in Appendix X. This procedure includes the screening of the aggregate using a photoionization detector (PID) unit to verify that contaminants have been successfully removed. Following this successful completion of this verification procedure, the aggregate material may be transferred to an outdoor storage location prior to shipment to an off-site location for further management.

Once the residual materials are generated, CENC removes the materials off site to an appropriate facility for further processing or disposal within three days (consistent with DRGSW Section 9.4.2.8.1) of being deemed a segregated process residue in accordance with the facility's Management of Aggregates Procedure referenced above. CENC intends to send any materials that can reasonably be recycled to a facility that is capable of recovering these resources. Accordingly, recovered rock, concrete, stone, brick, asphalt and scrap metal will be collected and routinely sent off site to an appropriate recycling facility.

2.6 Final Reuse Materials

The reuses of the remediated soils include, but are not limited to:

- Road base fill
- Topsoil supplement
- Landfill alternate daily or intermediate cover
- Structural and non-structural fill
- Final construction cover
- Asphalt plant feed

3.0 Waste Analysis and Characterization Plan for Petroleum Contaminated Soils

This Waste Analysis and Characterization Plan (WACP) describes the process, which includes sampling and analysis, used by CENC to evaluate potential contaminated soils for acceptance and processing at the facility. This process is intended to: 1) ensure that the contaminated soils received and accepted at CENC are both authorized under the facility's applicable state issued operating permit and suitable for processing and/or treatment; and 2) verify that the proposed soils are non-hazardous and do not contain unacceptable materials as defined in Section 3.1.2. The WACP also describes the procedures used by CENC to verify that the soils treated at the facility meet the conditions required for beneficial reuse.

The WACP divides waste sampling and analysis into three phases:

- **Pre-approval** sampling and analysis applies to those samples that are collected by the generator and reviewed by CENC prior to the issuance of approval to ship the waste to the CENC facility. Analyses performed during pre-approval are conducted at an off-site laboratory. If materials do not meet the pre-approval criteria, the soil will not be approved for shipment to the site. On occasion, CENC may also follow the limited pre-approval procedures specified in Section 3.2.1, below as necessary.

- **Pre-acceptance** sampling and analysis applies to samples that are collected by CENC from trucks of soil arriving at the site, prior to material acceptance. Such analyses will be conducted in the onsite laboratory.

- **Post-treatment** sampling and analysis applies to samples of the remediated soils collected by CENC that are analyzed by an off-site laboratory to verify the removal of the contaminants after processing and prior to soil reuse.

This section discusses the waste analysis requirements related to pre-approval, pre-acceptance and post-treatment testing for the general class/types of material accepted under the scope of this GOP. All analytical testing will be conducted in accordance with the most current, legal edition of SW-846 methods or the specified onsite laboratory test methods found in Appendix X, unless written approval from the Department is granted to utilize another test method. All waste generated as a result of these analyses will be disposed of in accordance with DRGSW and DRGHW, as applicable.

3.1 Approval Process for Petroleum Contaminated Soils

Each soil proposed for acceptance at CENC triggers the approval process described below. This approval process involves careful review by CENC of the information and data supplied by the generator, which is then compared to the approval requirements specified for the material.

Generators/agents that intend to send contaminated soils to CENC for the treatment and/or processing must comply with CENC's waste approval process as set forth below. This process also includes the preapproval sampling and analysis requirements outlined in Section 3.2. CENC will provide the generator/agent with a copy of the facility's approval package (see Appendix III) which must be completed and submitted to CENC for review. This package includes a Non-Hazardous Profile Sheet that must be completed and certified by the generator/agent. In addition to the information provided in the Profile Sheet, the generator/agent must sample and analyze the soil in accordance with the procedures specified in Section 3.2 below. The data developed from this sampling and analysis, along with other supporting information such as registration form from an aboveground or underground storage tank (AST/UST), shall be submitted to CENC along with the Profile Sheet for approval.

CENC will review the completed Profile Sheet and any analytical or any supporting data supplied by the generator/agent to determine whether the soils meets the facility's acceptance criteria and related permit requirements. If the soil is deemed acceptable, and consistent with the requirements of the facility's permit, CENC assigns an approval (job) number to the soil that is unique to the customer and the soil project. In certain instances, CENC may issue a limited pre-approval where final approval and acceptance may be based on supplemental sampling and analysis performed following the arrival of the soils at the facility as described in Section 3.2.1 below. In either case, the approval number issued by CENC is used to identify the soil throughout its movement and processing at the Facility. This number will appear on various waste tracking documents at the Facility and is attached to the Facility's electronic database tracking system.

3.1.1 Acceptable Materials

Only soils contaminated with RCRA non-hazardous petroleum hydrocarbons, non-PCB mineral oils, natural oils and RCRA non-hazardous MGP coal distillates that meet the standards set for the in the facility's operating permit may be

accepted for treatment in the soil remediation unit. Acceptable sources of contamination from petroleum compounds are restricted to:

- Automotive crankcase and lubricating oils, fuel oils (ASTM numbers 1-6), diesel fuel, gasoline, kerosene, and aviation fuel;
- MGP Soils;
- Used oil, defined by the Department as "Any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities";
- Waste Oil, defined by the Department as "Wastes, such as bottom clean-out waste from virgin fuel oil storage tanks or virgin fuel oil spill cleanup that are not used oil because they have not been "used" for their intended purpose." [50 FR 49174] For the purposes of the CENC issued permit, solvent contaminated waste oil does not meet the definition of waste oil; and
- Other Natural oils as identified in Table 3-2.

3.1.2 Unacceptable Materials

Unacceptable Sources of contamination include:

- Material determined to be RCRA hazardous, whether listed or characteristic, as defined by DRGHW.
- Sources contaminated with used or waste oil not complying with the definitions listed in Section 3.1.1.

3.2 Required Sampling and Analysis for Waste Approval

Each contaminated soil project that is proposed to be accepted at CENC for treatment and/or processing must be appropriately sampled and analyzed either at the generator site or at the facility as prescribed here to ensure that the soil meets the facility acceptance criteria and any required permit conditions. In addition to this information, the generator/agent will submit the data prescribed on the Non-Hazardous Profile Sheet, as required in Section 3.1 above. All analysis required to be performed in this section must be completed by an independent qualified laboratory using the most current legal edition of U.S. EPA SW-846 approved methods, or another EPA authorized equivalent method that has been approved by the Department in writing.

All soils proposed for approval by CENC must be sampled and analyzed in accordance with the criteria specified in Table 3-1, Minimum Incoming Soil Testing and Acceptance Criteria. Other than those contaminants who concentrations are reduced by the thermal or biological treatment utilized at the CENC facility, all soils received at the facility must meet the TCLP criteria for non-hazardous waste. . Soils that may be destined for another reuse authorized by an out-of-state regulatory agency may meet the constituent concentration criteria required for that reuse, if the soils can be sufficiently segregated and managed separately at the facility.

3.2.1 Limited Pre-Approval Procedures

On occasion, CENC receives requests for approval of soil projects where extensive testing has already been completed to properly characterize the soil following testing protocols to comply with state specific site remediation standards and/or to meet the acceptance criteria for another processing or disposal facility. In these instances, there are frequently sample parameters and/or testing frequencies that do not match CENC's specific approval criteria. The procedures specified below detail the methods CENC may employ to receive the soils based on existing analytical data supplied by the generator and hold final acceptance pending the completion of additional sampling and analysis as conducted by CENC after arrival. The soil managed under these limited pre-approval procedures will remain segregated at the facility until sufficient analysis has been received to ensure the soils meet the facility's acceptance criteria.

All contaminated soils managed under these limited pre-approval procedures will be reviewed to ensure the soils are properly characterized prior to receipt as part of the facility's approval process. Accordingly, these soils must meet the minimum incoming soils testing and acceptance criteria for the parameters listed in Table 3-1. The Facility Manager or authorized designee may require additional analysis, as needed, to ensure the soil received is sufficiently characterized for proper handling and management prior to receipt. In addition to the characterization testing data, CENC will utilize the Non-Hazardous Profile Sheet and other documents pertaining to the site history and/or site investigations supplied by the soil generator to evaluate materials considered for the limited pre-approval process to ensure that the materials are expected to meet the facility's acceptance criteria.

CENC will implement the limited pre-approval procedures described here for contaminated soils when the pre-approval testing supplied by the generator may be either lacking certain test parameters and/or when the testing supplied does not meet the frequency specified under the pre-approval testing requirements specified in Section 3.2 above. Specifically, these limited pre-approval procedures will be applied to supplement analysis supplied by the generator with data obtained from analyzing samples collected following arrival at CENC when the pre-approval data supplied by the generator does include, or does not match the testing frequency, as required under Table 3-1.

Contaminated soils that will be managed pursuant to these limited pre-approval procedures will be delivered to the CENC facility and staged onsite in one of the previously approved storage areas as indicated on the Facility Site Plan Drawing, SP-01 prepared by CPS. The material will be kept segregated from other incoming soils and properly marked with the staging approval (job) number. Following arrival at the facility, CENC will randomly select an incoming vehicle to collect a sample for analysis. Alternatively, CENC will collect a composite sample from the segregated stockpile of soils staged onsite. The sample collected will be submitted to an independent qualified laboratory to obtain the identified parameters that were omitted, or did not meet the required frequency, from the generator's initial test data. Samples collected will be used to supplement the data until the next sampling interval. At which time, if the project soils are still being received, CENC will collect a sample for the next sampling interval (e.g., 1 sample will be collected and analyzed for each 1000 ton TPH sampling interval).

Upon receipt of the results of the limited pre-approval testing, CENC will review the information and make a final approval and waste acceptance determination for the material. If, in the unlikely event, the results of the analysis indicate that the soil does not meet CENC's permit acceptance criteria, CENC will immediately contact the generator to initiate arrangements to have the soil returned to the generator or sent to an alternate facility selected by the generator.

All contaminated soils received and sampled in accordance with the limited pre-approval testing procedures specified here will also be subject to the incoming load verification procedures specified in Section 3.3 below.

3.3 Incoming Load Verification

A representative sample of the incoming soil is collected from each truck that arrives at the CENC facility. Sampling from the truck body also allows an opportunity for CENC personnel to visually inspect a delivery before discharging the soils into storage areas. The onsite analysis provides the facility direct control over waste acceptance, reduces the potential for illicit waste shipments, and provides for a greater sampling frequency of critical parameters.

For contaminated soils that are received for thermal remediation, each sample of the incoming shipment will be delivered to the onsite laboratory where it will be evaluated (visually) to assure the material is consistent with the approval package submitted by the generator/agent as described in Section 3.1 above.

For contaminated soils that are received for thermal treatment, each sample of the incoming shipment will be evaluated as described below (DRS Soils are sampled as described in Operating Module 1). Samples are delivered to the onsite laboratory for analysis. Individual truck samples from the same generator and soil project may be combined to form a composite sample for the analysis performed by the facility's onsite laboratory. CENC will combine the samples to form two (2) composite for the first 100 tons (approximately 4 trucks) of soil received from the soil project. CENC will continue to test one (1) composite sample from each 100 tons of soil received thereafter from the same project. Samples from the incoming loads are tested using a chloride detection system to measure total organic halides (TOX) following the most current, legal version of EPA Method 9023. The TOX analysis results obtained will be evaluated as follows:

1) if TOX sample results are <50 mg/kg the soil may be accepted at the facility;
2) if the TOX is > 500 mg/kg the soil must be rejected; or
3) if the TOX sample results are ≥ 50 mg/kg, but less than or equal to 500 mg/kg the soil must be further analyzed for PCBs using the most recently approved version of EPA Method 8082. These results of this additional testing will be compared to the acceptance criteria in Table 3-1. If the results exceed CENC's acceptance limits, the load will be rejected as described in Section 2.2.2.

The TOX analysis is used as a screening method to ensure that the soils do not contain levels of PCBs above specified permit limits that require management as a TSCA waste and are prohibited for acceptance and/or treatment at CENC. All analyses performed

onsite will follow the Standard Operating Procedures found in Appendix X or in accordance with the most current, legal edition of the SW-846 methods.

These incoming load verification samples are also evaluated for geotechnical characteristics and moisture content to determine whether the addition of soil drying agents are required as outlined in Section 2.4 above. The addition of soil drying agents minimizes the need to expend excess energy to thermally heat soils to remove water.

If the analysis indicates the material is acceptable, the truck is directed to the unloading area in the middle of the facility or to one of the facility's TPH Storage Buildings. After receiving the first four loads of a project on the same operating day, CENC may allow drivers to unload prior to the completion of the pre-acceptance analysis required above if the soils are from the same project and generator and none of the prior loads received from the soil project exceeded the facility's pre-acceptance analytical criteria. If soils are received from the same project on additional operating days, CENC may not unload the soils prior to receipt of the pre-acceptance analysis from the laboratory until at least four (4) loads from that project are received and the pre-acceptance analysis successfully demonstrates that the soil meets the facility's acceptance criteria. Once the same project from the same site of generation has been sampled in accordance with the above in-truck sampling requirements for a period of five (5) operating days, CENC will review all the associated verification testing results. If the TOX results are 75% below the 50mg/kg limit for soil acceptance, CENC will no longer require the in-truck sampling of the first 4 truckloads each operating day. These first 4 loads will be permitted to unload prior to sampling. This practice will be terminated and in-truck sampling of the first 4 truckloads each operating day will resume if any TOX result from the project exceed 75% of the acceptance criteria.

If the load does not meet the acceptance criteria, CENC will contact the generator if any material is found that does not conform to the approval to resolve any discrepancies and if necessary reject the shipment. CENC will notify the SHWMB within 24 hours of any shipment being rejected. If, after acceptance, CENC determines the contaminated soils are unacceptable, CENC must notify the SHWMB immediately with the reason for rejection and the soil will be removed from the CENC facility within 72 hours unless otherwise authorized by the Department.

If the contaminated soil is determined to be a hazardous waste, CENC shall contact the SHWMB immediately and remove the NHRM within 72 hours, unless otherwise authorized by the Department. All removal and disposal shall comply with all applicable

sections of Delaware's Regulations Governing Hazardous Waste (DRGHW). A copy of the hazardous waste manifest used to represent the shipment offsite shall be submitted to the SHWMB and a copy shall be maintained by CENC onsite for three (3) years and made immediately available for DNREC review upon request.

The onsite analytical results will be retained with the analytical results produced by the off-site laboratory (pre-acceptance sampling results) and maintained at the CENC facility for three (3) years. These results will be made available for DNREC review immediately upon request.

3.4 Post-Treatment Soil Sampling and Analysis

The purpose of this sampling and analysis is to confirm that the soils treated by CENC meet the reuse conditions established through the facility's operating permit and in this GOP.

This sampling plan assumes that CENC's resource recovery processes produce a product that is relatively consistent and homogenous.

Following the thermal treatment of the contaminated soils, a composite sample of the remediated soil must be collected every 300 tons or at the end of each working day, whichever occurs first. Samples are submitted to a laboratory for analysis within three working days and analyzed for Diesel Range Organics (DRO) in accordance with the most current, legal version of EPA Method 8015. Test results are received within three (3) working days.

In addition to the DRO analysis specified above, CENC shall obtain a representative, composite sample of each treated batch. Remediated soil is produced in batches by the facility based on the characteristics of the soils that are being received at CENC and based on the intended designated reuse location. Treated batches will be comprised of thermally remediated soils that have met the post-treatment DRO testing criteria and/or treated BRS soils that have met the post-treatment DRO testing criteria specified in Section 3.2 of Operating Module 3. CENC will collect a representative sample from each treated batch for analysis. Each treated batch will be segregated from other batches and will be analyzed separately to ensure that the soil in the batch meets the specific reuse conditions specified below. Each treated batch pile ranges between 2,500 to 4,000 tons, but will not exceed 4,000 tons. This batch size is necessary to allow CENC to maintain operational flexibility for its process and to effectively perform the sampling as described Appendix VI. The sampling size and grid sampling procedure to be utilized will maintain

the integrity of the evaluation procedure and ensure that the data objectives for the sampling plan are achieved.

CENC has established separate post-processed soil analytical testing and applicable reuse limits for the final processed/treated soil produced at CENC. Both the analytical parameters and the specified reuse limits will vary based on the intended beneficial use. Accordingly, CENC has prepared three (3) Testing Schedules that detail the parameters that will be tested, as well as the applicable reuse limits established, based on the end use. These schedules for reuse are provided in Appendix V, and include the following.

- Schedule 1: Topsoil supplement for commercial or industrial reuse. Examples: Compost Plant feed, landscaping applications.
- Schedule 2: Construction material, road sub-base, structural and non-structural fill and landfill top or final construction cover.
- Schedule 3: Delaware State landfill operating cover (daily/intermediate), out-of-state landfill cover, asphalt plant feed, other authorized reuse.

Once the post-process soil testing has been completed, process batches can be combined or reblended as long as the resulting batch, based on the weighted average of the above analytical results, meets the beneficial use criteria established by the proposed end use site as outlined in Schedule 1-3 above

3.5 Use of Alternate Risk-Based Standards

A Risk Assessment Evaluation Report (see Appendix) was completed to determine alternative risk-based standards for certain chemical constituent compounds. This Risk Assessment Report evaluated the actual risk posed based on the handling and use of the processed soils from CENC as alternate daily/intermediate cover ("ADC") material at Delaware landfill facilities that have been permitted and sited in accordance with the Delaware Regulations Governing Solid Waste (DRGSW). The Risk Assessment Evaluation included an analysis of potential human exposure risks to both onsite workers as well as possible offsite exposures to the public.

3.5.1 Alternate Requirements for Metals

Based on the risk assessment performed, alternative risk-based limits have been established for the maximum total metal constituent levels that may be present in any ADC soils produced by CENC (these levels are listed in Table 1 of the Risk Assessment Evaluation Report included in Appendix V). The maximum total

metal constituent limits are based on the potential exposure risk for both possible offsite receptors as well as for onsite landfill workers. The total maximum metal constituent levels are based on a total acceptable risk for onsite workers of $1x10^{-5}$ (1/100,000), for possible carcinogenic compounds or a total Hazard Index of 1.0, for any other compounds. The limits established are referenced in the Risk Assessment Evaluation Report are provided in Appendix IV.

3.5.2 Polycyclic Aromatic Hydrocarbons (PAH)

Based on the Risk Assessment Evaluation Report detailed above, a risk-based limit was established for total PAH compounds, as Benzo(a)pyrene (BAP). Total PAH's are determined using additive weighted factor basis using the ratio of the individual PAH compounds SIRS reporting limit compared to the SIRS reporting limit for BAP. For example, only $1/10^{th}$ or 10% of the quantity of a PAH compound that has a SIRS reporting limit that is 10 times greater than that of BAP will count towards the determination of the total PAH's in the cover soils. The total PAH risk-based limit for cover soils are based on a total acceptable risk of 1×10^{-5} (1/100,000) and can be found in the Risk Assessment Evaluation Report provided in Appendix IV.

3.5.3 Cumulative Annual Average

In addition to the individual maximum risk based limits for metals and PAHs as specified above, CENC will maintain a log of the final soil batch test results for these compounds , in addition to the results for BTEX and PCB's, to develop a rolling annual average concentration for each constituent that will establish a maximum cumulative risk exposure level. The annual cumulative risk based concentration limits for these combined petroleum related compounds are based on an acceptable total risk level of 1×10^{-5} (1/100,000) and a maximum total Hazard Index level of 1.0. The Risk Assessment Evaluation Report that references these limits is included in Appendix IV.

4.0 Inspection and Monitoring Procedures

CENC has installed a monitoring and inspection program at its facility to ensure that the facility equipment and operating areas are properly maintained and functioning and that required safety and emergency equipment is available and in operating condition. All CENC equipment will be inspected and maintained in accordance with the respective manufacturers' recommendations. The facility's maintenance staff monitors the condition of the equipment in operation at the site and will perform most routine service and repair. Outside service contractors are also used as needed.

Weekly inspections of the tank farm and other waste management/storage areas are conducted by facility personnel. A record of each inspection is maintained by the Facility Manager, or his designee. Any deficiencies found are noted and brought to the Facility Manager's attention for appropriate correction action. A copy of the weekly facility inspection report utilized to perform these inspections is provided in Appendix VII.

Adequate instrumentation and automatic process controls allow for the safe operation of the thermal processing system. Automatic safety controls, temperature gauges, and recording devices allow the plant to run only within strict operating parameters. A computerized operating system controls the monitoring, collection and retention of data, and analysis of plant performance. Printouts of performance parameters will be maintained for a minimum of three years.

Monthly inspections of all safety equipment, including, as applicable, fire extinguishers, spill equipment, supplies, and communications equipment will be conducted and logged. Any deficiencies will be noted and brought to the Facility Manager's attention for immediate correction. A copy of this inspection log is also included in Appendix VII of this Plan.

All inspection records will be maintained for three (3) years and made immediately available for DNREC review upon request.

5.0 Recordkeeping

CENC will maintain appropriate records in accordance with DRGSW Section 9.4.3.
Such facility records will include the following information:

- Types and weights or volume of solid waste received;
- Weight or volume of each material recycled or marketed;
- A record of the commercial solid waste haulers using the facility and the types and weight or volume of solid wastes delivered each day;
- Process monitoring data;
- Characterization testing of recyclable materials;
- Weight or volume of unprocessable solid wastes and the location of ultimate disposal of such materials;
- Characterization testing of process residues;
- A record of fires, spills, and uncontrolled releases that occur at the facility;
- Documentation of training provided to employees;
- Fire and safety inspections;
- Major equipment maintenance.

CENC will maintain the records detailed above for a period of at least three (3) years. These records will be made immediately available for review by DNREC upon request.

The facility will also complete an annual report that is submitted to the Department by March 1st of every year that will include information as outlined in Condition III.E of the facility's Resource Recovery Permit. The contents of this annual report may be revised by the Department upon written notice to the facility.

6.0 Emergency Response and Contingency Procedures

The emergency response and contingency procedures that must be implemented in the event of a fire, spill or explosion at the facility are outlined in the facility's existing Contingency and Emergency Response Plan. This Plan includes the new storage locations, waste types and traffic patterns that will result once NHRM operations are fully implemented as described in Operating Module 2. A copy of the Plan is provided in Appendix VIII.

7.0 Closure Plan

A Facility Closure Plan has been developed to describe the appropriate procedures that will be used to properly decontaminate and close the waste management units located at this facility. A copy of this Plan is included as Appendix IX.

8.0 Groundwater Monitoring Program

The CENC facility has a series of seven groundwater monitoring wells (MW1, MW2, MW3, MW4, MW5, MW6 and MW7) existing onsite that are currently sampled and tested quarterly (January, April, July and October). Upon written request, the Department may reduce the sampling frequency. CENC will be submitting a request to DNREC to decrease the sampling frequency to annual sampling. If approved, CENC will revise its groundwater sampling and testing frequency accordingly.

Each well will be sampled using the Low Stress Purging and Sampling Procedure for the collection of groundwater samples from monitoring wells provided in Appendix X. The samples collected will be analyzed for the following parameters:

- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) using EPA SW-846 Method 8260
- Total petroleum hydrocarbons – diesel range organics (TPH-DRO) using EPA SW-846 Method 8015

As outlined in the sampling procedure, during each monitoring event field measurements are collected for temperature, pH, specific conductance and turbidity. These results are reported to the Department annually as described in Section 5.0 above.

Table 3-1

Minimum Incoming Soil Testing and Acceptance Criteria

TABLE 3-1:
Minimum Incoming Soil Testing and Acceptance Criteria for TRS and BRS Soils

Requirement	Acceptance Criteria
Sampling Requirements*: One representative, composite sample must be obtained and analyzed for every 1,000 tons of soils submitted for approval to the CENC facility. Set forth below are the minimum testing criteria for all thermal remediation soils ("TRS soils") and biological remediation soils ("BRS soils") received at CENC. Additional testing criteria may be required to address potential contaminants that may be reasonably expected to be present in the soil based on environmental due diligence to determine treatment and end use.	
Required Analysis: Each sample must be analyzed for the following parameters by an independent laboratory using EPA SW-846 testing methodology or an alternative approved method as authorized by DNREC:	
☐ RCRA Characteristics (i.e., ignitability, reactivity, corrosivity)	May not exhibit any RCRA hazardous characteristics
☐ TCLP or Total RCRA Metals**	Results must be below RCRA toxicity thresholds (40 CFR 261.24)
☐ BTEX	No limit
☐ Benzene	No limit
☐ Toluene	No limit
☐ Ethylbenzene	No limit
☐ Xylene	No limit
☐ Total Polychlorinated Biphenyls (PCBs)	< 3.0 mg/kg or end use criteria***
☐	
☐	

*The analytical requirements for small residential projects (less than 100 tons) involving contaminated soils resulting from heating oil or fuel oil tank removals will be limited to TPH analysis only. In addition, for soil contaminated with coal distillates from MGP sites, sampling frequency may be on a site by site basis when approved by the Department.

**A generator certification may be accepted in place of the analytical testing data for pesticides, herbicides, or pyridine based on data collected as a result of environmental due diligence. This exclusion must be approved by CENC's General Manager. Soil from sites previously used to manufacture, distribute, or package pesticides, herbicides, or agricultural insecticides must include TCLP for pest/herb. Sites that are abandoned will be screened for pesticides/herbicides using TOX. If the TOX exceeds 10 mg/kg, TCLP must be run for pest./herb. If the result of a total constituent analysis for soil is less than twenty (20) times the applicable TCLP regulatory level for the constituent, then the total analysis result may be used to demonstrate compliance with the TCLP acceptance criteria. TPH soils that are solely from leaking UST gasoline or fuel oil tanks (kerosene, #2, #4 and #6 fuel oils) only require TCLP testing for RCRA (8) metals if the soils are from a petroleum containing AST or UST removal in Delaware (with the exception of tanks containing waste oil), the testing authorized by DNREC's Tank Management Branch may be accepted in lieu of the testing specified here when accompanied by a Delaware registration form.

***This acceptance criteria applies to soils that are destined for reuse at a Delaware landfill for daily or intermediate cover. An alternate acceptance limit for PCBs may be established, with prior written approval by the Department, based on the approved limit of the end use location where the soils will be placed. Higher concentration of PCBs may only be accepted when the source of contamination is unknown and the waste does not meet the definition of a PCB Remediation Waste, as defined in 40 CFR 761.3.

Additional Information Required:
Generators will be required to provide a Non-Hazardous Profile Sheet that is signed and certified by the generator or his designated authorized agent prior to approval for acceptance at CENC. No soils destined for reuse at a Delaware landfill for

cover will be accepted from any State Superfund site (which include HSCA, VCP and Brownfield sites) or federally identified Superfund sites.

Table 3-2

Summary of Natural Oils for Processing at the CENC Facility

TABLE 3-2
SUMMARY OF NATURAL OILS IN SOILS FOR PROCESSING AT THE CENC FACILITY

Contaminant & PADEP Residual Waste Code (1)	General Classification	Description	Designate Streams		General Composition	Expected Processing Classification Light or Heavy Hydrocarbons
White Oils	Mineral Oil	Derivatives of mineral oil and paraffinic hydrocarbons. Uses include refrigeration seal oil, textile lubricants, finishing agents, paper impregnation, and medicinal and food applications.	Seal Oil Cosmetic Oil	White Oil	Mixture of aliphatic hydrocarbons. Oxygen, nitrogen, and sulfur containing compounds are removed. Generally does not contain additives.	Heavy
Natural Waxes	Wax	Natural waxes include animal, vegetable, and mineral. Uses include polishes, candles, crayons, sealants, rubber/plastic suncracking protection, adherent cosmetics, paper coating, packaging food products, electrical insulation, waterproofing, and cleaning compounds.	Beeswax Shellac Wax Candelilla Sugar Cane Ceresin Paraffin	Lanolin Carnauba Bayberry Ozocerite Montain Microcrystalline	Mixture of aliphatic petroleum distillate and microcrystalline paraffinic waxes in petroleum residual.	Heavy
Synthetic Wax and Wax Blends	Wax	Synthetically waxes with properties similar to natural waxes, including polishes, candles, crayons, sealants, rubber/plastic sun cracking protection, adherent cosmetics, paper coating, packaging food products, electrical insulation, water-proofing, and cleaning compounds.	Polyethylene Wax Carbowaxes Polyhydric Esters Fatty Acid Amides Polyol Ether Esters	Ethylene Copolymer Wax Gersthofen Waxes Waxy Ketones Imide Waxes	Mixture of organic polymers and halogenated naphthalenes.	Heavy
Animal Oils	Fat	Animal fat oil from feet or meat (bovine). Used for waterproofing, softening leather, lubricant, and oiling wood.	Neatsfoot Cod-liver Oil Herring Oil Tanners Oil	Beef Tallow Butterfat Oil Lard Oil	Mixture of esters, fatty acids, carboxylic acids, glycerides, eleostearic acid, croton resin, essential oils, and terpenes.	Heavy

Vegetable Oils Essential Oils Edible Oils	Fat	Oil derived from plants or specialized plant cells, not from animals or rocks. Used for base oil in shellacs, paints (interior and exterior), varnishes linoleum, and floor cloth. Shoe polish, leather finish, and electrical insulation. Medicine (counterirritant, cathartic). Material Accepted is limited to the oil itself and not the products (e.g., paints, varnishes, etc.).	Olticia Oil Cocoa Butter Linseed Oil Palm Kernel Rapeseed Oil Safflower Oil Peanut Oil Tung Oil Molasses Resin Oil Almond Oil Coconut Oil Groundnut Oil Palm Oil Poppyseed Oil	Sesame Oil Sunflower Oil Turbine Oil Carnauba Wax Soapstock Oil Castor Oil Cottonut Oil Olive Oil Perilla Oil Resin Oil Soybean Oil Tucum Oil Corn Syrup Croton Oil	Mixture of esters, fatty acids, carboxylic acids, glycerides and stearic, palmitic, myristic, lauric, and oleic acids, eleostearic acid, and croton resin, essential oils, and terpenes.	Heavy
Petrolatum	Mineral Oil/Wax	Purified mixture of semisolid hydrocarbons, chiefly branched aliphatic hydrocarbons and high-boiling liquid, in which more of the liquid hydrocarbons are held within colloidal micelles. An ointment base used in cosmetics, lubricating firearms and machinery, leather grease, shoe polish, rust preventative, and modeling clays	Vaseline™ Petroleum jelly Filtrolatum Kremoline Sherolatum Saxoline	Stanolene Vasolint Filtrosoft Pureline Stanolind Cosmoline	Petrolatum is a colloidal system of high boiling liquid hydrocarbons contained micelles within non-straight-chain solid hydrocarbons.	Heavy
Tall Oil	Oils	Oil derived from acid treatment of alkaline liquors from the pulping of pinewood.	Tall Oil		Rosin acids and fatty acids.	Light

Appendix IV

Risk Assessment Evaluation of Chemical Constituent Criteria for Alternate Daily/Intermediate Cover Materials Produced for Use at Delaware State Landfills

Risk Assessment Evaluation of Chemical Constituent Criteria for Alternate Daily/Intermediate Cover Materials Produced for Use at Delaware State Landfills

Clean Earth of New Castle, LLC
New Castle, DE
&
Clean Earth of Philadelphia, LLC
Philadelphia, PA

Revised November 2016

Prepared For: Clean Earth of New Castle, LLC
and
Clean Earth of Philadelphia, LLC

Prepared By: Michael D. Logan, CHMM, CET
Vice President, Environmental Services

Compliance Plus Services, Inc.
455 Business Center Drive, Suite 250
Horsham, PA 19040
215.734.1414

Table of Contents

1.0 Project Overview

Compliance Plus Services, Inc. ("CPS") has completed the following risk assessment evaluation of the chemical constituent criteria for the Alternate Daily/Intermediate Cover ("ADC") material used at solid waste landfills operated in the State of Delaware ("Delaware landfills") and produced at the Clean Earth of New Castle, LLC ("CENC") and Clean Earth of Philadelphia, LLC ("CEP") facilities. CENC and CEP are both soil recycling/recovery facilities that have provided processed materials to the Delaware landfills in the past (over an approximate 20 year period) for use as daily and/or intermediate cover material.

CENC and CEP facilities both accept materials contaminated by petroleum hydrocarbon related compounds and other chemical contaminants resulting from historical industrial, commercial or agricultural uses. Both operating plants utilize low-temperature thermal desorption and physical treatment techniques to process the contaminated soils they receive into soil/fill products that may be beneficially used in place of native soil and aggregate fill material. The Clean Earth facilities focus their recycling and treatment of incoming contaminated soils to generate products that meet the chemical constituent concentration criteria of the intended end use. This risk assessment evaluation is intended to review the suitability and appropriateness of specific alternate chemical constituent reuse limits that Clean Earth has proposed for the ADC soil products that are produced by CENC under their Resource Recovery Permit (SW-02b-16) and CEP via approval of alternate daily cover letter dated June 23, 2016 to the previous Beneficial Use Determination ("BUD") #16.

The landfill cover materials produced by both CENC and CEP for use at the Delaware landfills have represented an environmentally sound and cost effective method to comply with daily cover requirements. The current use of Clean Earth's recycled soils has allowed hundreds of thousands of tons of soils to be returned to the marketplace for beneficial use. Similarly, the return of these soils as useful recycled products, avoids having to replace these recovered soils with virgin borrow soils, saving valuable natural resources.

The goal of this risk assessment evaluation is to establish reuse concentration limits for the daily/intermediate landfill cover that have been proposed by Clean Earth (as outlined in Table 1) and assure the limits provide suitable protection to public health and the environment. Unlike many other commercial or industrial soil reuse applications, use as landfill daily/intermediate cover represents a significantly restricted site specific use at a regulated and monitored facility. Accordingly, this risk assessment evaluation takes into consideration the existing engineering and permitting controls and restrictions that are required to be in place at Delaware landfills under Delaware Regulations Governing Solid Waste ("DRGSW").

2.0 Landfill Siting Criteria

The operating permits issued to Delaware landfills restrict the types of wastes managed at the landfills to the non-hazardous solid wastes as described further in Section 3.0 below. The State of Delaware has established several regulatory provisions, based ostensibly on the U.S. Environmental Protection Agency ("EPA") solid waste landfill location criteria specified in 40 CFR 258.10, that restricts the physical location where solid waste or sanitary landfills may be placed or sited. These "siting criteria" restrictions are specified in Title 7 Section 1301, Delaware Regulations Governing Solid Waste ("DRGSW") and identify several instances where new landfill cells, or solid waste storage, are not permitted. Among the restrictions detailed in Section 5.1 of the DRGSW, new landfill cells cannot be located:

- Within the 100-year flood plain as delineated by the Federal Emergency Management Agency;
- In an area that may cause or contribute to the degradation of any state or federally regulated wetlands unless the owner or operator can demonstrate to the satisfaction of the appropriate wetlands regulatory agency;
- Within one mile of any state or federal wildlife refuge, wildlife area, or park, unless specifically exempted;
- So as to be in conflict with any locally adopted land use plan or zoning requirement;
- Within the wellhead protection area of a public water supply well or well field or a formally designated aquifer resource protection area;

- In areas classified as seismic impact zones, unless additional protection measures are in place, or in areas where valuable aquifers could be threatened, unless suitable design measures were incorporated into the facility; and
- Within 200 feet of the facility property boundary, unless otherwise approved by the Department.

These regulatory provisions have been established by both U.S. EPA and the Delaware Department of Natural Resources and Environmental Control ("DNREC") to ensure that the location and use of the landfill will not significantly impact (negatively) public health or the surrounding environment. These measures are intended to be protective standards and are based on the Department's evaluation as to the risks associated with the types of wastes and materials managed and handled at the landfill site. Accordingly, if the proposed soils to be used as daily cover are no more hazardous than the wastes and/or cover materials managed and utilized at the landfill, then the siting criteria established to protect human health and the environment for the wastes and cover materials accepted are expected to substantially provide the same (or greater) level of protection from the ADC soils produced by CENC and CEP.

3.0 Landfill Design Requirements and Operating Controls

Delaware landfills permitted to accept municipal and residential solid wastes must be designed and operated in accordance with provisions specified in the DRGSW. These design and operating requirements are in addition to the specific siting criteria described in Section 2.0 above. The DRGSW establishes appropriate management and engineering controls to ensure that the wastes disposed of at these facilities are handled in a manner that is protective of human health and the environment.

The design requirements and operating controls specified for Delaware landfills include elements such as:

- Liner system design and construction requirements, to restrict the migration of leachate from the landfill and prevent contamination of underlying groundwater;

- Leachate collection, treatment and disposal provisions;
- Gas control measures that evacuate gas from within the waste to prevent accumulation of gas onsite or offsite;
- Surface water management controls;
- Groundwater monitoring measures;
- Capping system requirements; and
- Routine operating and maintenance requirements, including cover requirements (daily/intermediate).

4.0 Functions of Daily Cover Material

Daily cover materials used at landfills serve several regulatory and operational functions. According to the study completed for EPA in July 1993, entitled "The Use of Alternative Materials for Daily Cover at Municipal Solid Waste Landfills", these functions include:

- Control of disease vectors by limiting access by birds and animals, as well as the minimization of breeding areas;
- Control of blowing litter, odors and other air emissions, scavenging;
- Reducing the risk and spread of fires;
- Increasing runoff to prevent infiltration;
- Control of gas movement.

These functions are similarly detailed in the regulations promulgated by the EPA under 40 CFR 258.21 Criteria for Municipal Solid Waste Landfills. The DRGSW details the functions for daily cover under Section 5.9.2.3.1.1 which states that "Daily cover shall control odors, disease vector breeding, animal attraction, blowing litter, scavenging, and reduce the potential for fires." The daily landfill cover materials supplied by both the CENC and CEP facilities have historically demonstrated that the material meets these regulatory and operational criteria. Moreover, the Delaware landfills that have used the Clean Earth soils for cover have consistently expressed satisfaction with the consistency and quality of the cover materials supplied by the Clean Earth

facilities and considers this supply of ADC as a preferred material. Since the recycled soils have the same or similar characteristics as the conventional borrow soils which they are replacing, it is expected that the recycled product produced at CENC and CEP will continue to meet these operational expectations for use as daily/intermediate cover.

5.0 Characteristics of Alternate Daily/Intermediate Cover Soil

The ADC product processed by CENC and CEP is generated at these facilities using thermal treatment, physical processing and other soil remediation techniques to take contaminated soils (containing principally petroleum hydrocarbon (TPH) contamination) and creating soil/fill products that may be beneficially reused. Principally, these facilities use an on-site low-temperature desorption unit to volatize and destroy hydrocarbon contaminants within the incoming soils, although other approved soil remediation processes are sometimes used. Following treatment, the remediated soils are tested to demonstrate that the materials meet the constituent concentration criteria specified by the end user.

In addition, both facilities also have the ability to generate ADC products from soils which, as received, already meet the chemical constituent criteria of the end use, however, the soils require physical treatment to meet certain geotechnical requirements of its intended end use. For example, prior to use as landfill daily or intermediate cover, the recycled materials must be relatively uniform in particle size to provide an effective cover, contain sufficient moisture to minimize operational concerns during handling, etc. Consequently, CENC and CEP may receive soils that do not require thermal treatment prior to reuse, but must be physically processed to ensure that geotechnical standards are met before the material is suitable for beneficial use.

As outlined in Section 3.0 of the EPA's July 1993 Report entitled "The Use of Alternative Material for Daily Cover at Municipal Solid Waste Landfills", EPA/600/14, the study concluded that the use of petroleum contaminated soils as a potential landfill cover material should be promoted as a suitable ADC material. The Report states that "since petroleum-based products are biodegradable, use of petroleum-contaminated soil does not present a significant environmental risk, as these products can be degraded within the landfill environment." The

Report goes on to state that "With the exception of being contaminated with petroleum products, such soils are used and perform similar to conventional soil cover."

Similarly, the proposed ADC cover material produced by CENC and CEP are intended to provide materials that perform similar to conventional soil cover but do not present a significant environmental risk based on the proposed restricted use. Accordingly, CENC and CEP are establishing chemical contaminant reuse levels that ensure that the ADC material does not present any unreasonable increased risk when used at Delaware landfill as cover. As previously detailed, the landfill design and permitting criteria already establish appropriate controls and procedures to ensure that these materials do not present an unreasonable risk to human health or the environment. Further, during the permitting process, all Delaware landfills must adhere to applicable requirements established by the State of Delaware and enforced by DNREC. To comply with these requirements, each Delaware landfill develops operating procedures to ensure that the landfill and its workers can effectively manage materials with these characteristics.

Consequently, the ADC materials supplied by CENC and CEP will meet the following minimum criteria established by the Delaware Solid Waste Authority ("DSWA"):

- TCLP for EPA SW-846 constituents; results must be below the toxicity characteristic levels in accordance with the DRGHW (Delaware Regulations Governing Hazardous Waste) 261.24;
- Ignitibility – must be non-ignitable in accordance with DRGHW 261.21;
- Corrosivity – must be non-corrosive in accordance with DRGHW 261.22;
- Reactivity – must be non-reactive in accordance with DRGHW 261.23;
- BTEX – must meet the following standards: Benzene – 0.5 ppm; Toluene – 10 ppm; Ethlybenzene – 5 ppm; Xylene – 5 ppm;
- PCBs – CENC's specific limit under its existing approval as Alternate Daily Cover and CEP's Authorized Beneficial Use Determination for Alternative Daily Cover material establishes limit of 3 ppm for PCBs;
- Solids Content – must be at least 20% solids.

In addition, ADC materials produced by CENC and CEP will meet the Proposed Alternative Daily Cover Limits for Delaware Landfills (Metals and PAHs, as benzo-a-pyrene) [1] as presented in Table 1 – Proposed Alternative Daily Cover Limits for Delaware Landfills. Table 1 also includes annual average concentration limits for these compounds to ensure repeated exposures do not increase risk to landfill workers as detailed in Section 7.0 below. The constituent concentrations of other compounds that may be present in cover materials will be based on DNREC's Site Restoration and Investigation Section ("SIRS") Soil Reporting Levels, unless noted otherwise in Table 1. Additional constituents may be analyzed for when they are reasonably expected to be present in the ADC soils.

The TPH standard, as presented in Table 1, has been historically applied to recycled soils received from the CENC and CEP facilities. Since the principal contaminant in the soils received at these facilities is TPH, which is thermally treated onsite, this level has been established primarily to minimize any potential concerns regarding possible petroleum odors at Delaware landfills. These landfills have determined this level based on prior experience in handling TPH contaminated soils at their respective sites.

The alternate standards presented in Table 1 as Proposed Alternative Daily Cover Limits for Delaware Landfills are based on use of a risk-based approach due to the relative frequency that these compounds are found present in contaminated soils managed at the CENC and CEP facilities above their respective SIRS limits. These particular compounds are routinely found in historic fill materials due to their wide use in industrial, commercial and agricultural applications. In evaluating the potential risk of offsite exposure to these compounds, we believe as stated above, the landfill design and containment systems are sufficient to minimize the risk of potential exposure to these materials based on the restricted use as daily cover to the landfill.

[1] *Total PAH's are determined using a weighted factor basis using the ratio of the individual PAH compound's SIRS Soil Reporting Level ("SRL") when compared to the SRL for Benzo(a)pyrene (BaP). For example, only 1/10th or 10% of the quantity of a PAH compound that has a SRL limit that is 10 times higher than that of BaP will count towards the determination of the total PAH's in the cover soils.*

The alternative standards presented in Table 1 were assessed using the risk analysis criteria specified in Sections 6.0 and 7.0 below. For possible offsite receptor risk exposures, this evaluation was completed to estimate the potential for exposure to particulate emissions from use of the cover material from wind dispersion. The model employed applied extremely conservative assumptions relying on the risk of particulate emissions exceeding a threshold limit value (TLV) when the cover materials are applied at or near the border of a landfill cell or landfill unit. The wind dispersion values were calculated using the 200 foot property line set back established in the landfill siting criteria discussed in Section 2.0 above. Potential offsite exposure risks due to other possible pathways was considered de minimis since existing landfill controls were already established to minimize these risks. The potential exposure risks possible for offsite receptors are detailed in Section 6.0 below.

In addition to risks to offsite receptors, a detailed evaluation was conducted of potential exposure risks to onsite workers during the handling and placement of these cover materials. This evaluation is detailed in Section 7.0 below.

6.0 Risk Assessment of Potential Particulate Emissions from Wind Dispersion

For the purposes of this evaluation, CPS estimated the potential maximum downwind concentration (MDC) emission levels for three contaminants of concern at a Delaware landfill property line when ADC materials are being applied at the landfill. Specifically, emissions of all parameters with Final Proposed Limits in Table 1 that differ from the SIRS Reporting Limit or the established Landfill Acceptance Limit. These compounds were selected based on the criteria detailed in Section 5.0 above. The use of the MDC values was used following the standard method employed by DNREC's Air Quality Management Section using EPA's SCREEN3 Modeling Program. This method determines the maximum downwind concentration exposure level from a potential source and compares the level determined to the threshold limit value ("TLV") established by the American Conference of Governmental Industrial Hygienists

("ACGIH") or, in the case of PAH's (as BaP), the permissible exposure limit ("PEL") established by the U.S. Occupational Safety and Health Administration ("OSHA"). The contaminant concentration levels in the ADC material were reviewed to ensure that potential emissions from their application did not exceed the TLV or PEL limits for the individual compounds as calculated for the MDC at the landfill's property line.

This risk exposure modeling is conservative since it assumes that the cover material is being used as close to the property line as the landfill siting criteria will allow. In addition, the TLV and PEL exposure rates are based on direct exposure over an eight and half hour period. However, these Delaware landfill facilities do not have any offsite receptors located at or near their property line. The MDC values determined are inversely proportional to the distance from the established source to the receptor. As this distance is increased the calculated MDC level decreases. Consequently, the further the source is from the receptor, the smaller the exposure risk is from the application of these ADC material.

Two methods were used to calculate the emissions of the contaminants listed above. First, a "drop calculation" detailed in U.S. EPA AP-42, Chapter 13.2.4, was used to estimate the emissions of particulate matter (PM). The potential contamination within the PM emissions was used to calculate the concentration of the contaminant at the property line using EPA's SCREEN3 Modeling Program. A summary of the data used and the SCREEN 3 supporting calculations for the calculation methods are provided in Attachments 1 and 3 of this Report.

The attached Table 2 – SCREEN 3 Max Downwind Concentrations at Property Line summarizes the concentration of emissions at the property line and the evaluation of the MDC levels to the OSHA PEL or ACGIH TLV, for the parameters in which the SCREEN 3 modeling was completed.

As shown in Table 2, the levels of each contaminant are below the applicable thresholds established by ACGIH and OSHA. Again, these potential exposures are extremely conservative and severely weighted to provide the maximum level of protection to public health.

7.0 Risk Assessment to Onsite Workers

The potential worker exposure evaluation was completed using the Risk Assessment Information System ("RAIS") calculator program. The RAIS is a web-based risk assessment tool, which is recommended for use by DNREC-SIRS. This recommendation can be found in Section 9.1.3 of Delaware's HSCA Human Health Risk Assessment Guidelines (HSCA). The purpose of the Initial Risk Screening as described in Section 9.1.3 of the HSCA Guidelines, is to determine whether a site (the chemical compounds associated with the site) pose a potential threat to human health, welfare, and the environment under specific conditions. To develop the potential risk exposure assumptions that will be used for the RAIS analysis, CPS conducted an evaluation of the methods typically employed to manage ADC materials at a landfill both before and after placement. Accordingly, for this evaluation, we considered the following:

1) Receipt of the ADC materials at the site;
2) Stockpiling and storage ADC materials onsite;
3) Transfer of the ADC materials to the working face of the landfill; and
4) Application or final placement of the cover material.

During each of these management scenarios, several site workers may be exposed to the soils, including:

1) Truck driver(s) delivering the ADC material to the site;
2) The loader/equipment operator(s) assigned to assist with the unloading and stockpiling of cover material at the site until they are used;
3) The loader/equipment operator(s) used to transfer the material to the working face;
4) The bulldozer/equipment operator(s) used to apply the cover material over the trash/waste;
5) The compactor/equipment operator(s) who may compact or ride on the soil as part of their daily activities; and

6) The landfill truck spotter(s) who direct truck traffic from incoming waste shipments to the working face throughout the day.

Based on the risk assessment evaluation of these possible worker categories or positions, we believe that truck spotter has the highest potential exposure risk to the ADC cover used at the landfill. This assumption is based on several factors including the close proximity of these workers to the ADC material, the level of personal protective clothing and equipment available or employed by these workers and the amount of time of that these workers may be exposed to cover at the site. Based on our review, the equipment operators and/or truck drivers are typically working in an enclosed, or partially enclosed, cab that are frequently equipped with air conditioners/heaters that help to mitigate potential exposures to particular matter. In addition, these employees are generally elevated above the surface where the cover is applied and are less susceptible to direct exposure conditions.

Accordingly, we utilized assumptions provided in Attachment 2 as input data into the RAIS calculator using the typical worker exposure data collected for a landfill truck spotter. The RAIS model used standard activity exposure conditions for an outdoor industrial worker. Based on this input data, the RAIS calculator model was run at the Final Proposed Limit for each of the metals and total PAHs (as BaP) specified in Table 1. In each case the potential risk of exposure for landfill workers was evaluated to ensure that the total risk did not exceed 1×10^{-5} (1/100,000) or the total Hazard Index (HI) of 1.0 and is provided in Attachment 4. In addition to the RAIS models for the individual parameters, a combined RAIS model was run using all the Final Proposed Annual Average Limits for PAHs (as Benzo-a-pyrene) and the metals. This risk assessment is provided in Attachment 4 and indicates the Total Risk for the combined parameters is below the total risk level of 1×10^{-5} and below a total Hazard Index of 1.0. Both CEP and CENC produce ADC materials using a batch process where the soil batch is limited to 4,000 tons. A risk exposure limit is proposed for each batch based on the maximum constituent concentration level for each compound using the 1×10^{-5} or HI of 1.0, as an acceptable risk standard. In addition, CEP and CENC will maintain an annual average concentration for the ADC materials based on a weighted accumulative exposure rate to all metals, PAHs and PCBs.

These results are summarized below. Again, this exposure risk is based on the highest potential exposure to employees at the landfill.

8.0 Summary

As discussed in the sections above, the recycled soils proposed by CENC and CEP for use as ADC material at Delaware landfill facilities provides various benefits at a low cost to the landfills. These Delaware landfills are operated by a state appointed operating authority that does not receive state or federal tax money to fund these landfill operations. Accordingly, these landfills must be prudent with their overall operating costs while maximizing environmentally conscious management. In general, these landfill operators are expected to define, develop, and implement cost-effective plans and programs for solid waste management which best serve Delaware and protect the public health and the environment.

The use of the recycled materials from the Clean Earth facilities provides an effective alternative to harvesting borrow soils. These recycled materials also perform the functions required of cover materials at a lower cost. As demonstrated in Section 6.0 above, the proposed ADC material does not pose any significant increase in risk to public health or the environment. Additionally, the landfill's current permit restrictions and management systems are designed to be protective and minimize the potential risks of exposure or migration offsite. Accordingly, it is clear that the alternate standards are protective of human health and the environment when considering offsite exposure potentials.

Based on the risk assessment evaluation of onsite worker exposures for the PAH's as Benzo-a-pyrene and metals, we believe that a site specific risk exposure standard for these cover materials can be established using the Delaware State lowest mandated standard of incremental lifetime cancer risk increase of one in one hundred thousand (1/100,000 or 1×10^{-5}) total acceptable risk standard for the landfill workers exposure. The risks were calculated using DNREC-SIRS HSCA Guidelines, which were established to ensure that the risk standards are acceptable. Consequently, based on the offsite evaluation criteria, we recommended risk-based alternate cover standards outlined in Table 1.

Table 1

Proposed Alternative Daily Cover Limits for Delaware Landfills

Table 1 - Proposed Alternate Daily Cover Limits for Delaware Landfills

Analyte[1]	DE SIRS Screening Level Table for Soil (mg/kg)	SIRS Reporting Level (mg/kg)	Basis for Limit	Final Proposed Limit[2] (mg/kg)	Final Proposed Annual Average Limit[3] (mg/kg)
Total Petroleum Hydrocarbons					
Total Petroleum Hydrocarbons as DRO	1000	1000	DSWA Minimum Std.	1000	
Polychlorinated Biphenyls (PCB)					
Total PCBs	0.23	0.23	DSWA Minimum Std.	3.0*** (As Aroclor 1254)	2.0 (As Aroclor 1254)
Aroclor 1016	0.41	4.1	DSWA Minimum Std.		
Aroclor 1221	0.2	2	DSWA Minimum Std.		
Aroclor 1232	0.17	1.7	DSWA Minimum Std.		
Aroclor 1242	0.23	2.3	DSWA Minimum Std.		
Aroclor 1248	0.23	2.3	DSWA Minimum Std.		
Aroclor 1254	0.12	1.1	DSWA Minimum Std.		
Aroclor 1260	0.24	2.4	DSWA Minimum Std.		
Aroclor 5460	3.5	35	DSWA Minimum Std.		
BTEX					
Benzene	1.2	12	DSWA Minimum Std.	<0.5***	
Ethylbenzene	5.8	58	DSWA Minimum Std.	<5.0***	
m-Xylene	55	550	DSWA Minimum Std.	<5.0***	
o-Xylene	65	650	DSWA Minimum Std.	<5.0***	
p-Xylene	56	560	DSWA Minimum Std.	<5.0***	
Toluene	490	4900	DSWA Minimum Std.	<10.0***	
Xylene (mixed)	65	580	DSWA Minimum Std.	<5.0***	
Total BTEX	None	None	DSWA Minimum Std.	10***	
TCLP Testing	N/A	N/A	DSWA Minimum Std.	Below TCLP Non-Hazardous Limits	

Table 1 - Proposed Alternate Daily Cover Limits for Delaware Landfills

Analyte[1]	DE SIRS Screening Level Table for Soil (mg/kg)	SIRS Reporting Level (mg/kg)	Basis for Limit	Final Proposed Limit[2] (mg/kg)	Final Proposed Annual Average Limit[3] (mg/kg)
Metals					
Aluminum	51200	77000	Risk Based	200,000	50,000
Antimony	3.1	31	Risk Based	900	75
Arsenic	11	11	Risk Based	77	20
Barium	1500	15000	Risk Based	20,000	7,500
Beryllium	16	160	Risk Based	4,500	250
Boron	1600	16000	Risk Based	16,000	50
Cadmium	7.1	71.0	Risk Based	1,000	200
Chromium III and compounds	12000	50000	Risk Based	310,000	50,000
Chromium VI and compounds	0.3	3	Risk Based	155	15
Cobalt	34	34	Risk Based	650	50
Copper	310	3100	Risk Based	10,000	2,500
Total cyanide	0.27	NA	Risk Based	145	5
Iron	74767	74767	Risk Based	200,000	50,000
Lead	400	400	Risk Based	4,500	750
Manganese	2100	2100	Risk Based	20,000	2,500
Mercury	1.1	11	Risk Based	700	50
Nickel	150	840	Risk Based	10,000	2,000
Selenium	39	390	Risk Based	1,000	10
Silver	39	390	Risk Based	1,000	200
Thallium	0.078	0.78	Risk Based	23	3.5
Tin	4700	47000	Risk Based	200,000	50,000
Vanadium	134	390	Risk Based	1,400	250
Zinc	2300	23000	Risk Based	61,000	15,000

Table 1 - Proposed Alternate Daily Cover Limits for Delaware Landfills

Analyte[1]	DE SIRS Screening Level Table for Soil (mg/kg)	SIRS Reporting Level (mg/kg)	Basis for Limit	Final Proposed Limit[2] (mg/kg)	Final Proposed Annual Average Limit[3] (mg/kg)
Polycyclic Aromatic Hydrocarbons (PAHs) (Concentrations in equivalent concentration BaP, mg/kg)					
Acenapthene	360	360	Risk Based	7.7 (as BaP)	3.5 (as BaP)
Anthracene	1800	18000	Risk Based		
Acenaphthyhlene	NA	NA	Risk Based		
Benzo(a)anthracene	0.82	1.6	Risk Based		
Benzo(b) fluoranthene	1.11	1.6	Risk Based		
Benzo(k) fluoranthene	1.6	16	Risk Based		
Benzo(a)pyrene	0.24	0.24	Risk Based		
Carbazole	NA	NA	Risk Based		
Chrysene	16	160	Risk Based		
Dibenz(ah)anthracene	0.09	0.17	Risk Based		
Fluoranthene	240	2400	Risk Based		
Fluorene	240	2400	Risk Based		

Table 1 - Proposed Alternate Daily Cover Limits for Delaware Landfills

Analyte[1]	DE SIRS Screening Level Table for Soil (mg/kg)	SIRS Reporting Level (mg/kg)	Basis for Limit	Final Proposed Limit[2] (mg/kg)	Final Proposed Annual Average Limit[3] (mg/kg)
Indeno(1,2,3-cd) pyrene	1.3	1.6	Risk Based		
2-Methylnaphthalene	24	240	Risk Based		
Naphthalene	3.8	38	Risk Based		
Phenanthrene	180	1800	Risk Based		
Pyrene	180	1800	Risk Based		
Total PAHs as BaP	None	None	Risk Based	7.7	3.5

N/A - Not Applicable

*** These values are based on the historic limits established by DSWA for their landfill ADC soils. There are no proposed changes to these limits.

[1] With the exception of those compounds where the limit is based on DSWA's standard acceptance testing criteria, testing for the indivdiual analytes identified here is only required for those constituents that are resonably expected to be present in the ADC soils.

[2] Please note that the Final Proposed Limit may be less than the maximum Risk Assessment Value that was calculated. In these cases, the proposed limit is based on the maximum expected concentration that will be in any ADC soils.

[3] The Final Proposed Annual Average Limit establishes the maximum average concentration that may be in the ADC soil when the total risks for those chemical constituents that have a limit based on risk modeling (i.e., metals and PAHs) are combined with BTEX and PCBs (the constituents typically present in petroleum contaminated soils.

N:\#0150 - CLEAN EARTH INC\Project #0150-0799-02\CENC Facility\Solid Waste Permit Renewal 2015\Operations Plan and Operating Modules\TRS Tables\[11-15-16 Final Proposed ADC Limits Table Rev2.xlsx]Table3-2

Attachment 2

Summary Table of Risk Assessment Assumptions

Risk Assessment Assumptions for Landfill Worker Exposures-Low PPE

Parameter	Proposed Value	Basis for Proposed Value
Ambient air concentration	0 $\mu g/m^3$	Background ambient air concentrations are assumed to be zero for the proposed constituents of concern.
Acres	0.5	Area of potential exposure
Averaging Time	365 Days	Length of time for average to be calculated – 1 year
Exposure duration	20 years	The default value for the RAIS model is 25 years. This value was reduced based on the actual time a worker is reasonably expected to be employed as a Truck Spotter based on historical experience of the landfill operator.
Exposure frequency	250 days/yr	The default value of 225 days/year is based on the assumption of an employee working up to 5 days per work week. This value considers vacation time, holidays, sick leave and periods of time where the employee would not actively be working on the landfill cover due to scheduled and unscheduled shut downs, etc. A 250 day value is being used consistent with the DNREC's request to provide a more conservative assumption here.
Exposure Interval	20 years	See discussion of Exposure duration above.
Exposure time	8 hrs/day	8 hours is the default value provided by the RAIS.
Lifetime	70 yrs	This value was determined to be a conservative estimation of an approximate life span.
Q/C_{wp}	60.64 $(g/m^2\text{-}s)/(kg/m^3)$	Default value for the emission flux at the center of a square source over the geometric mean air concentration.
Q/C_{vol}	60.64 $(g/m^2\text{-}s)/(kg/m^3)$	Default value for the ratio of the emission flux at the center of a square source over the geometric mean air concentration
Particulate Emission Factor	2,440,343,898 m^3/kg	Default value in the RAIS for particulate emission factor
A (PEF Dispersion Constant)	10.29	Default value provided on RAIS.

Risk Assessment Assumptions for Landfill Worker Exposures-Low PPE

Parameter	Proposed Value	Basis for Proposed Value
B (PEF Dispersion Constant)	18.71	Default value provided on RAIS.
C (PEF Dispersion Constant)	212.27	Default value provided on RAIS.
Skin adherence factor	0.05 mg/cm^2	Default value provided on RAIS is 0.12 mg/cm^2. This assumes no adjustment or reduction for personal protective garments, such as long sleeve shirts, jackets and occasional use of gloves (particularly during winter months), etc. In addition, the Skin Exposure Factor for outdoor workers is skewed toward skin adherence on the hands due to the amount of time typical outdoor workers are physically handling soil with their hands. Such is the case with construction workers, farm workers or even gardeners. Truck Spotters are not expected to physically dig in ADC soils or handle the soils. Accordingly, based on professional judgement the value was reduced to be reflective of actual exposures. See October 5, 2016 response letter to Jason Sunde, of DNREC, for further justification.
Body weight	80 kg (or 176 lbs.)	Value was considered to be an average adult's body weight based on reference studies.

Risk Assessment Assumptions for Landfill Worker Exposures-Low PPE

Parameter	Proposed Value	Basis for Proposed Value
Soil ingestion rate	50 mg/day	The original Risk Assessment established a rate of 20 mg/day for the truck spotter based on a blended rate derived from the indoor worker and the gardener from Table 4-15 taken from Chapter 4 of the 1997 Exposure Factors Handbook. The 1997 Exposure Factors Handbook was utilized as the 2011 version did not have any updated references to individual workers performing specific tasks as was provided in the 1997 version of the Exposure Factors Handbook. We believe the analysis which uses the worker specific references provided in the 1997 Exposure Factors Handbook and references the same 1991 study and adequately supports the soil ingestion factor of 20 mg/day for DSWA Truck spotters. Additionally, we note that none of the case studies or worker models utilized by EPA are reflected on a Truck Spotters potential exposure. The truck spotter is not actively digging in ADC soils, ADC soils typically have sufficient moisture content and low silt content that fugitive emissions are relatively low, and the truck spotters have access to sanitary facilities, clean lunch rooms and are instructed in standard hygiene practices that are not incorporated into the default ingestion value that is referenced in Exposure Factors Handbook. See October 5, 2016 Response letter to Jason Sunde, of DNREC, for information on this assumption. A value of 50 mg/day was chosen to provide a more conservative value for the assessment based on agreements with DNREC.

Risk Assessment Assumptions for Landfill Worker Exposures-Low PPE

Parameter	Proposed Value	Basis for Proposed Value
Surface area	3527 cm^2/day	The default value for the model is 3527 cm^2/day. The original Risk Assessment used a value of 2500 cm^2/day based on the expected exposure surface area of the body that was calculated based on amount of protective work clothing utilized during seasonal weather conditions. Typically, workers are expected to wear short sleeve shirts in the summer and long sleeves shirts in the winter, long pants, work boots, hard hats, and occasionally gloves. The "Exposure Factors Handbook", Chapter 7- Dermal, EPA/600/R-090/052F updated by the USEPA September 2011, provides surface area values for the various parts of the body (hand, arms, hands, etc.) The value of 2500 cm^2 was calculated assuming reductions in the surface area of the head (for the hat and glasses), reductions for the arms for sleeves, and a partial reduction for the occasional use of gloves. For the purposes of this model, however, the default value was used to be conservative based on agreements with DNREC.
Climatic Zone	Philadelphia, PA	Philadelphia is the closest regional city to Delaware that is available in the model.
Subject area size	0.5 acres	This represents the approximate area that would constitute the active working face of a typical landfill.
Fraction of vegetative cover	0.0 (unitless)	The workers would be in the vicinity of the active working face of the landfill, so no vegetative cover is expected to be present.
Mean annual wind speed	4.023 meters/ sec	This provided value was obtained from the National Climatic Data Center (NCDC) for the average annual wind speed (9 mph) for Wilmington, DE. This information is available from http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html .
Equivalent threshold value	11.32 (unitless)	This value was a default value from the RAIS model and is expected to be representative.

Risk Assessment Assumptions for Landfill Worker Exposures-Low PPE

Parameter	Proposed Value	Basis for Proposed Value
Function dependant on Um/Ut derived using Coward et al. 1985	0.055 (unitless)	This value was a default value from the RAIS mode and is expected to be representative.
Fraction of organic carbon in soil	0.006 g/g	This model uses the default value and is representative for typical landfill cover.
Dry soil bulk density	1.5 g/cm^3	This model uses the default value and is expected to be representative.
n (Total Soil Porosity)	0.43396 L_{pore}/L_{soil}	This model uses the default value from the RAIS.
Water-filled soil porosity	0.15 L_{water}/L_{soil}	This model uses the default value and is expected to be representative.
Air Filled Soil Porosity	0.28396 L_{air}/L_{soil}	This model uses the default value from the RAIS.
Soil particle density	2.65 g/cm^3	This model uses the default value and is expected to be representative.
Exposure interval	819,936,000seconds	Default value provided on RAIS.
A (VF Dispersion Constant)	10.2871	Default value provided on RAIS.
B (VF Dispersion Constant)	18.7124	Default value provided on RAIS.
C (VF Dispersion Constant)	212.2704	Default value provided on RAIS.
Volitization Factor	0 m^3/kg	Default value provided on RAIS.
Depth of source	NA	Default value provided on RAIS.

The parameters for all chemicals thus far have been outdoor workers exposed by soil, user-provided chemicals data sources, chronic RfD/RfC types, and chronic daily intakes and toxicities are displayed in output.
https://rais.ornl.gov/cgi-bin/prg/RISK_search?select=chem

Attachment 4

Risk Modeling

Site-specific Risk
Outdoor Worker Equation Inputs for Soil

Variable	Value
AT_{ow} (averaging time - outdoor worker)	365
EF_{ow} (exposure frequency - outdoor worker) day/yr	250
ED_{ow} (exposure duration - outdoor worker) yr	20
ET_{ow} (exposure time - outdoor worker) hr	8
LT (lifetime) yr	70
BW_{ow} (body weight - outdoor worker)	80
IR_{ow} (soil ingestion rate - outdoor worker) mg/day	50
SA_{ow} (surface area - outdoor worker) cm^2/day	3527
AF_{ow} (skin adherence factor - outdoor worker) mg/cm^2	0.05
City (Climate Zone) Selection	21
A_s (acres)	0.5
Q/C_{wp} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m^2-s per kg/m^3	60.63827859
PEF (particulate emission factor) m^3/kg	2440343898
A (PEF Dispersion Constant)	10.2871
B (PEF Dispersion Constant)	18.7124
C (PEF Dispersion Constant)	212.2704
V (fraction of vegetative cover) unitless	0
U_m (mean annual wind speed) m/s	4.023
U_t (equivalent threshold value)	11.32
F(x) (function dependant on U_m/U_t) unitless	0.055358589
A_s (acres)	0.5
Q/C_{vol}(inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m^2-s per kg/m^3	60.63827859
foc (fraction organic carbon in soil) g/g	0.006
ρ_b (dry soil bulk density) g/cm^3	1.5
ρ_s (soil particle density) g/cm^3	2.65
n (total soil porosity) L_{pore}/L_{soil}	0.43396
θ_a (air-filled soil porosity) L_{air}/L_{soil}	0.28396
θ_w (water-filled soil porosity) L_{water}/L_{soil}	0.15
T (exposure interval) s	819936000
A (VF Dispersion Constant)	10.2871
B (VF Dispersion Constant)	18.7124
C (VF Dispersion Constant)	212.2704
VF_s (volitization factor) m^3/kg	0
Q/C_{vol} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m^2-s per kg/m^3	60.63827859
A_s (acres)	0.5
T (exposure interval) yr	26
ρ_b (dry soil bulk density) g/cm^3	1.5
A (VF Dispersion Constant - Mass Limit)	10.2871
B (VF Dispersion Constant - Mass Limit)	18.7124
C (VF Dispersion Constant - Mass Limit)	212.2704

Output generated 21NOV2016:11:05:55

Site-specific Risk for Outdoor Workers for Individual Parameters

Site-specific Risk
Outdoor Worker RISK for Soil

Chemical	Concentration (mg/kg) Final Proposed Limit	Total HI	Total Risk
Metals			
Aluminum	200000	0.0894	-
Antimony Trioxide	900	0.964	-
Arsenic, Inorganic	77	0.078	9.98E-06
Barium	20000	0.0466	-
Benzene	0.5	0.00126	8.43E-08
Beryllium and compounds	4500	0.984	2.89E-07
Boron And Borates Only	16000	0.0343	-
Cadmium (Diet)	1000	0.498	4.81E-08
Chromium(III), Insoluble Salts	310000	0.0885	-
Chromium(VI)	155	0.0223	9.83E-06
Cobalt	650	0.938	1.56E-07
Copper	10000	0.107	-
Cyanide (CN-)	145	0.976	-
Iron	200000	0.122	-
Lead and Compounds	4500	-	4.68E-06
Manganese (Non-diet)	20000	0.394	-
Mercury, Inorganic Salts	700	0.999	-
Nickel Soluble Salts	10000	0.224	6.95E-08
Selenium	1000	0.0856	-
Silver	1000	0.0856	-
Thallium (Soluble Salts)	23	0.985	-
Tin	200000	0.143	-
Toluene	10	0.000173	-
Vanadium	1400	0.119	-
Zinc and Compounds	61000	0.087	-
Polycyclic Aromatic Hydrocarbons (PAH)			
Benzo[a]pyrene	7.7	-	1.00E-05

Output generated 21NOV2016:09:22:47

N:\#0150 - CLEAN EARTH INC\Project #0150-0799-02\CENC Facility\Risk Assessment\RAIS 2016\Updated RAIS Results CENC Oct 3 2016\[DEP Parameter Max.xlsx]Sheet1

Combined Risk Assessment for PAH; BTEX, PCBs and Metals

Site-specific Risk
Outdoor Worker RISK for Soil

Chemical	Concentration Final Proposed Annual Average Limit (mg/kg)	Total HI	Total Risk
Polychlorinated Biphenyls (PCB)			
Aroclor 1254	2	0.0639	8.30E-07
BTEX			
Benzene	0.5	0.00126	8.43E-08
Ethylbenzene	5	0.000248	1.69E-07
Toluene	10	0.000173	-
Xylene, P-	5	0.00231	-
Xylene, m-	5	0.00236	-
Xylene, o-	5	0.002	-
Xylenes	5	0.00225	-
Metals			
Aluminum	50000	0.0223	-
Antimony Trioxide	75	0.0803	-
Arsenic, Inorganic	20	0.0203	2.59E-06
Barium	7500	0.0175	-
Beryllium and compounds	250	0.0547	1.60E-08
Boron And Borates Only	50	0.000107	-
Cadmium (Diet)	200	0.0996	9.62E-09
Chromium(III), Insoluble Salts	50000	0.0143	-
Chromium(VI)	15	0.00215	9.51E-07
Cobalt	50	0.0721	1.20E-08
Copper	2500	0.0268	-
Cyanide (CN-)	5	0.0337	-
Iron	50000	0.0306	-
Lead and Compounds	750	-	7.80E-07
Manganese (Non-diet)	2500	0.0493	-
Mercury, Inorganic Salts	50	0.0713	-
Nickel Soluble Salts	2000	0.0449	1.39E-08
Selenium	10	0.000856	-
Silver	200	0.0171	-
Thallium (Soluble Salts)	3.5	0.15	-
Tin	50000	0.0357	-
Vanadium	250	0.0212	-
Zinc and Compounds	15000	0.0214	-
Polycyclic Aromatic Hydrocarbons			
Benzo[a]pyrene	3.5	-	4.56E-06
**Total Risk/HI*	-	0.96	1.00E-05

Output generated 21NOV2016:11:05:55

N:\#0150 - CLEAN EARTH INC\Project #0150-0799-02\CENC Facility\Risk Assessment\RAIS 2016\Updated RAIS Results CENC Oct 3 2016\[DEP Parameter Averages.xlsx]Sheet1

Site-specific Risk
Outdoor Worker RISK for Soil

Chemical	Concentration Final Proposed Annual Average Limit (mg/kg)	Total HI	Total Risk
Polychlorinated Biphenyls (PCB)			
Aroclor 1254	2	0.0578	7.60E-07
BTEX			
Benzene	0.5	0.00126	8.43E-08
Ethylbenzene	5	0.000248	1.69E-07
Toluene	10	0.000173	-
Xylene, P-	2	0.000924	-
Xylene, m-	2	0.000943	-
Xylene, o-	2	0.0008	-
Xylenes	2	0.000899	-
Metals			
Aluminum	50000	0.0223	-
Antimony Trioxide	75	0.0803	-
Arsenic, Inorganic	22	0.0213	2.73E-06
Barium	7500	0.0175	-
Beryllium and compounds	250	0.0547	1.60E-08
Boron And Borates Only	50	0.000107	-
Cadmium (Diet)	200	0.096	9.62E-09
Chromium(III), Insoluble Salts	50000	0.0143	-
Chromium(VI)	15	0.00215	9.51E-07
Cobalt	50	0.0721	1.20E-08
Copper	2500	0.0268	-
Cyanide (CN-)	5	0.0337	-
Iron	50000	0.0306	-
Lead and Compounds	1000	-	1.04E-06
Manganese (Non-diet)	2500	0.0493	-
Mercury, Inorganic Salts	50	0.0713	-
Nickel Soluble Salts	2000	0.0449	1.39E-08
Selenium	10	0.000856	-
Silver	200	0.0171	-
Thallium (Soluble Salts)	3.5	0.15	-
Tin	50000	0.0357	-
Vanadium	250	0.0212	-
Zinc and Compounds	15000	0.0214	-
Polycyclic Aromatic Hydrocarbons			
Benzo[a]pyrene	3.5	-	4.14E-06
**Total Risk/HI*	-	*0.946*	*9.92E-06*

Output generated 15NOV2016:11:32:20

N:\#0150 - CLEAN EARTH INC\Project #0150-0799-02\CENC Facility\Risk Assessment\RAIS 2016\Updated RAIS Results CENC Oct 3 2016\[DEP Parameter Averages.xlsx]Sheet1

Appendix V

Post-Process Soil Analytical Testing Schedule

Schedule 1
Clean Earth of New Castle, LLC
Amended Soil Analytical Testing Schedule

Applies to following reuses: Topsoil supplement for commercial or industrial reuse.
Examples: Compost plant feed, landscaping applications

Meet the approved/authorized limit for the end use or use the applicable constituent concentrations specified below.

INORGANIC COMPOUNDS					
Parameter	SIRS Screening Level (mg/kg)	40 CFR Part 503 Standards (used in lieu of Screening Levels when biosolids are present) (mg/kg)	Final Max. without Biosolids Constituent Level in Remediated Soils (mg/kg)	Final Max. with Biosolids Constituent Level in Remediated Soils (mg/kg)	Frequency
Aluminum	51200		51200	51200	One composite sample per batch, max. batch size of 4,000 tons.
Antimony	28000		28000	28000	
Arsenic	11	41	11	11	
Barium	1500		1500	1500	
Beryllium	16		16	16	
Cadmium	7.1	39	7.1	7.1	
Chromium III and compounds	12000		12000	12000	
Chromium VI and compounds	0.3		0.3	0.3	
Cobalt	34		34	34	
Copper	310	1500	310	310	
Total cyanide	2.3		2.3 (based on lowest cyanide species-copper cyanide)	2.3 (based on lowest cyanide species-copper cyanide)	
Iron	75000		75000	75000	
Lead	400	300	400	300	
Manganese	2100		2100	2100	
Mercury	2.3	17	2.3	2.3	
Molybdenum	39	75	39	39	
Nickel	150	420	150	150	
Selenium	39	100	39	39	
Silver	39		39	39	
Thallium	0.078		0.078	0.078	
Vanadium	134		134	134	
Zinc	2300	2800	2300	2300	

VOLATILE ORGANIC COMPOUNDS			
Parameter	**SIRS Screening Level (mg/kg)**	**Final Max. Constituent Level in Remediated Soils (mg/kg)**	**Frequency**
Benzene	1.2	1.2	One composite sample per batch, max. batch size of 4,000 tons
Ethylbenzene	5.8	5.8	
m-Xylene	56	56	
o-Xylene	65	65	
p-Xylene	56	56	
Toluene	490	490	
Xylene (mixed)	58	58	

GENERAL ANALYTICAL PARAMETERS			
Parameter	**SIRS Screening Level (mg/kg)**	**Final Max. Constituent Level in Remediated Soils (mg/kg)**	**Frequency**
Total PCBs	3	3	One composite sample per batch, max. batch size of 4,000 tons
pH (Standard Units)		5.0 - 9.0	
Fecal Coliform		1000 MPN per gram of total solids[1]	
Total Petroleum Hydrocarbon	1000	1000	One composite sample required for every 300
Dioxins and Furans[2]	Varies	Meet applicable SIRS Screening Levels	One composite sample per batch, max. batch size of 4,000 tons

[1] Testing for Fecal Coliform is only required when biosolids are mixed with final remediated soils.

[2] Testing for Dioxins and Furans are only required when dredge materials are mixed with final remediated soils.

SEMI-VOLATILE ORGANIC COMPOUNDS			
Parameter	SIRS Screening Level (mg/kg)	Final Max. Constituent Level in Remediated Soils (mg/kg)	Frequency
Acenaphthene	360	360	One composite sample per batch, max. batch size of 4,000 tons
Acenaphthylene	---	---	
Anthracene	1800	1800	
Benzo (a) anthracene	0.82	0.82	
Benzo (a) pyrene	0.24	0.24	
Benzo (b) fluoranthene	1.11	1.11	
Benzo (g,h,i) perylene			
Benzo (k) fluoranthene	1.6	1.6	
Benzyl alcohol	630	630	
Bis (2-chloroethyl) ether	0.23	0.23	
Bis (2-ethylhexyl) phthalate	39	39	
Butylbenzylphthalate	290	290	
Carbazole	---	---	
2-Chloronaphthalene	480	480	
2-Chlorophenol	39	39	
4-Chloroaniline	2.7	2.7	One composite sample per batch, max. batch size of 4,000 tons
Chrysene	16	16	
Dibenzene (a,h) anthracene	0.17	0.17	
Dibenzofuran	7.3	7.3	
Dibutyl phthalate	630	630	
1,2 Dichlorobenzene	180	180	
1,3 Dichlorobenzene	---	---	
1,4 Dichlorobenzene	2.6	2.6	
3,3 Dichlorobenzidine	1.2	1.2	
2,4-Dichlorophenol	19	19	
Diethylphthalate	5100	5100	
2,4-Dimethylphenol	130	130	
Dimethyl phthalate	---	---	
Di-n-butylphthalate	630	630	
2,4-Dinitrophenol	13	13	
2,4-Dinitrotoluene	1.7	1.7	
2,6-Dinitrotoluene	0.36	0.36	
4,6-Dinitro-2-Methylphenol	---	---	
Di-n-octylphthalate	63	63	
Fluoranthene	240	240	
Fluorene	240	240	
Hexachlorobenzene	0.21	0.21	
Hexachlorobutadiene	1.2	1.2	
Hexachlorocyclopentadiene	0.18	0.18	
Hexachloroethane	1.8	1.8	
Indeno (1,2,3-cd) pyrene	1.3	1.3	
Isophorone	570	570	
2-Methylnaphthalene	24	24	
3-Methylphenol (m-cresol)	320	320	
2-Methylphenol (o-cresol)	320	320	
4-Methylphenol (p-cresol)	630	630	
Naphthalene	3.8	3.8	
2-Nitroaniline	63	63	
4-Nitrophenol	25	25	
Nitrobenzene	5.1	5.1	
N-Nitrosodimethylamine	2.00E-03	2.00E-03	
N-Nitrosodiphenylamine	110	110	
N-Nitroso-di-n-propylamine	0.078	0.078	
o-Phenylenediamine	12	12	
Pentachlorophenol	1	1	
Phenanthrene	180	180	
Phenol	1900	1900	
Pyrene	180	180	
1,2,4-Trichlorobenzene	5.8	5.8	
2,4,5-Trichlorophenol	630	630	
2,4,6-Trichlorophenol	6.3	6.3	

Schedule 2
Clean Earth of New Castle, LLC
Amended Soil Analytical Testing Schedule

Applies to following reuses: Construction material, road sub-base, structural and non-structural fill and landfill top or final construction cover

Meet the approved/authorized limit for the end use or use the applicable constituent concentrations specified below.

INORGANIC COMPOUNDS					
Parameter	**SIRS Reporting Limit (mg/kg)**	**40 CFR Part 503 Standards (used in lieu of URS when biosolids are present) (mg/kg)**	**Final Max. without biosolids Constituent Level in Remediated Soils (mg/kg)**	**Final Max. with biosolids Constituent Level in Remediated Soils (mg/kg)**	**Frequency**
Aluminum	77000		77000	77000	One composite sample per batch, max. batch size of 4,000 tons
Antimony	31		31	31	
Arsenic	11	41	11	11	
Barium	15000		15000	15000	
Beryllium	160		160	160	
Cadmium	71	39	71	39	
Chromium III and compounds	50,000		50,000	50,000	
Chromium VI and compounds	3		3	3	
Cobalt	34		34	34	
Copper	2100	1500	2100	1500	
Total cyanide	23		23 (based on lowest cyanide species – copper cyanide)	23 (based on lowest cyanide species – copper cyanide)	
Iron	74767		74767	74767	
Lead	400	300	400	300	
Manganese	2100		2100	2100	
Mercury	23	17	23	17	
Molybdenum	1000	75	1000	75	
Nickel	1500	420	1500	420	
Selenium	390	100	390	100	
Silver	390		390	390	
Thallium	0.78		0.078	0.78	
Vanadium	390		390	390	
Zinc	23,000	2800	23,000	2800	

VOLATILE ORGANIC COMPOUNDS			
Parameter	**SIRS Reporting Limit (mg/kg)**	**Final Max. Constituent Level in Remediated Soils (mg/kg)**	**Frequency**
Benzene	12	12	One composite sample per batch, max. batch size of 4,000 tons
Ethylbenzene	58	58	
m-Xylene	550	550	
o-Xylene	650	650	
p-Xylene	560	560	
Toluene	4900	4900	
Xylene (mixed)	580	580	

GENERAL ANALYTICAL PARAMETERS			
Parameter	**SIRS Reporting Limit (mg/kg)**	**Final Max. Constituent Level in Remediated Soils (mg/kg)**	**Frequency**
Total PCBs	3	3	One composite sample per batch, max. batch size of 4,000 tons
pH (Standard Units)		6.0 - 9.0	
Fecal Coliform		1000 MPN per gram of total solids[1]	
Total Petroleum Hydrocarbon		1000	One composite sample required for every 300 tons
Dioxans and Furans	Varies	Meet Applicable SIRS Reporting Limit[2]	One composite sample per batch, max. batch size of 4,000 tons

[1] Testing for Fecal Coliform is only required when biosolids are mixed with final remediated soils.

[2]Testing for Dioxins and Furans are only required when dredge materials are mixed with final remediated soils.

SEMI-VOLATILE ORGANIC COMPOUNDS			
Parameter	SIRS Screening Level (mg/kg)	Final Max. Constituent Level in Remediated Soils (mg/kg)	Frequency
Acenaphthene	3600	3600	One composite sample per batch, max. batch size of 4,000 tons
Acenaphthylene	---	---	
Anthracene	18000	18000	
Benzo (a) anthracene	1.6	1.6	
Benzo (a) pyrene	0.24	0.24	
Benzo (b) fluoranthene	1.6	1.6	
Benzo (g,h,i) perylene	---	---	
Benzo (k) fluoranthene	16	16	
Benzyl alcohol	6300	6300	
Bis (2-chloroethyl) ether	2.3	2.3	
Bis (2-ethylhexyl) phthalate	390	390	
Butylbenzylphthalate	2900	2900	
Carbazole	---	---	
2-Chloronaphthalene	4800	4800	
2-Chlorophenol	290	290	
4-Chloroaniline	27	27	
Chrysene	160	160	
Dibenzene (a,h) anthracene	0.17	0.17	
Dibenzofuran	73	73	
Dibutyl phthalate	6300	6300	
1,2 Dichlorobenzene	1800	1800	
1,3 Dichlorobenzene	---	---	
1,4 Dichlorobenzene	26	26	
3,3 Dichlorobenzidine	12	12	
2,4-Dichlorophenol	190	190	
Diethylphthalate	51000	51000	
2,4-Dimethylphenol	1300	1300	
Dimethyl phthalate	7800	7800	
Di-n-butylphthalate	6300	6300	
2,4-Dinitrophenol	130	130	
2,4-Dinitrotoluene	17	17	
2,6-Dinitrotoluene	3.6	3.6	
4,6-Dinitro-2-Methylphenol	---	---	
Di-n-octylphthalate	630	630	
Fluoranthene	2400	2400	
Fluorene	2400	2400	
Hexachlorobenzene	2.1	2.1	
Hexachlorobutadiene	12	12	
Hexachlorocyclopentadiene	1.8	1.8	
Hexachloroethane	18	18	
Indeno (1,2,3-cd) pyrene	1.6	1.6	
Isophorone	5700	5700	
2-Methylnaphthalene	240	240	
3-Methylphenol (m-cresol)	3200	3200	
2-Methylphenol (o-cresol)	3200	3200	
4-Methylphenol (p-cresol)	6300	6300	
Naphthalene	38	38	
2-Nitroaniline	630	630	
4-Nitrophenol	---	---	
Nitrobenzene	51	51	
N-Nitrosodimethylamine	0.02	0.02	
N-Nitrosodiphenylamine	1100	1100	
N-Nitroso-di-n-propylamine	0.78	0.78	
o-Phenylenediamine	120	120	
Pentachlorophenol	10	10	
Phenanthrene	1800	1800	
Phenol	19000	19000	
Pyrene	1800	1800	
1,2,4-Trichlorobenzene	57.8	57.8	
2,4,5-Trichlorophenol	6300	6300	
2,4,6-Trichlorophenol	61.6	61.6	

Schedule 3
Clean Earth of New Castle, LLC
Amended Soil Analytical Testing Schedule

Applies to following reuses: Delaware State Landfill operating cover (daily/intermediate), Out-of-state landfill cover or other reuse, Asphalt plant feed, or Other Authorized Reuse

Parameter	Final Max. Constituent Level in Remediated Soils (mg/kg)			Frequency
Total Petroleum Hydrocarbons (DRO)	1000			One Composite sample required for every 300 tons
Conduct Testing to Meet Requirements of Receiving Out-of-State Landfill, Asphalt Plant or final Reuse Facility/ Location	Meet Requirements of Reuse Facility			One Composite sample per batch, max. batch size of 4000 tons
For Delaware State Landfill Site - use as Alternative Daily/ Intermediate Cover	1) Meet applicable SIRS Reporting Limits; or*			One Composite sample per batch, max. batch size of 4000 tons
	2) Meet the maximum soil concentration standards for the specific individual maximum end use limits and average concentration limits per the Risk Assessment Evauluation Report,* as indicated below.**			
	Analyte	**Final Proposed Limit (mg/kg)**	**Final Proposed Annual Average Limit (mg/kg)**	
	PAHs	7.7 (as BaP)	3.5 (as BaP)	
	Benzene	0.5	NA	
	Ethylbenzene	5	NA	
	m-Xylene	5	NA	
	o-Xylene	5	NA	
	p-Xylene	5	NA	
	Toluene	10	NA	
	Xylene (Mixed)	5	NA	
	Total BTEX	10	NA	
	Total PCBs	3.0 (As Aroclor 1254)	2.0 (As Aroclor 1254)	
	Aluminum	200000	50000	
	Antimony	900	75	
	Arsenic	77	20	
	Barium	20000	7500	
	Beryllium	4500	250	
	Boron	16000	50	
	Cadmium	1000	200	
	Chromium III and compounds	310000	50000	
	Chromium VI and compounds	155	15	
	Cobalt	650	50	
	Copper	10000	2500	
	Total Cyanide	145	5	
	Iron	200000	50000	
	Lead	4500	750	
	Manganese	20000	2500	
	Mercury	700	50	
	Nickel	10000	2000	
	Selenium	1000	10	
	Silver	1000	200	
	Thallium	23	3.5	
	Tin	200000	50000	
	Vanadium	1400	250	
	Zinc	61000	15000	

* The soils will only be tested for those compounds reasonably expe cted to be present above SIRS Reporting Levels based on incoming analysis and onsite processing. For example, thermally treated soils will not be routinely tested for VOC compounds.

** The Risk Assessment Evaluation reviewed the use of the soils as daily/intermediate cover at Delaware landfills that meet the State's required siting crieria. The values presented are based on potential landfill worker exposures not exceeding a lifetime incremental risk of 1/100,000 for compounds with a carcinogenic effect or compounds having a total Hazard Index of 1.0.

N:\#0150 - CLEAN EARTH INC\Project #0150-0799-02\CENC Facility\Solid Waste Permit Renewal 2015\Operations Plan and Operating Modules\TRS Tables\[11-15-16 Final Proposed ADC Limits Table Rev2.xlsx]Table3-2

Operating Module 1

Management Procedures for Direct Reuse Soils ("DRS")

Operating Module 1

Management Procedures for Direct Reuse Soils

Clean Earth of New Castle, LLC
94 Pyles Lane, New Castle, Delaware 19720

Revised November 2016
Document Control Number:

Prepared by:
Compliance Plus Services, Inc.
P.O. Box 186
Hatboro, PA 19040
215.734.1414
1-866-976-PLUS

Project Number: 0150.0799.02

Table of Contents

OPERATING MODULE 1 – MANAGEMENT PROCEDURES FOR DIRECT REUSE SOILS

Operating Module 1 - Management Procedures For Direct Reuse Soils

1.0 OPERATING MODULE 1 – MANAGEMENT PROCEDURES FOR DIRECT REUSE SOILS

Clean Earth of New Castle, LLC ("CENC") has developed this Operating Module (Module) to describe the procedures that will be used to accept, manage and beneficially use soils that meet the definition of Direct Reuse Soils (referenced herein as "DRS" or "DRS Soils") as defined in Section 1.1 below. This Module is intended to supplement the General Operations Plan (GOP).

CENC, along with affiliate companies, have a long-standing history in the movement and removal of soils at various sites throughout the tri-state area. For the most part, these soil removal actions are related to the remediation of petroleum contaminated soils that have resulted from spills or past industrial uses. However, on numerous occasions in addition to the management of impacted soils, Clean Earth comes across projects that involve the removal of soil material that is being excavated to accommodate new construction or the demolition or restoration of previously occupied areas that have not been significantly impacted by prior operations and could be reused directly at a beneficial use site or as landfill cover. The collection and reuse of such soils will allow CENC to redirect these materials to be used in a beneficial manner.

1.1 Definitions

The following terms are used throughout this document to convey the meanings provided below. The definitions provided here are not intended to replace or supersede any relevant definitions already set forth in the Delaware Regulations Governing Solid Waste

(DRGSW).

1.1.1 ***"Clean Fill":*** As referenced in DRGSW Section 3, clean fill means a non-water-soluble, non-decomposable, environmentally inert solid such as rock, soil, gravel, concrete, broken glass, and/or clay or ceramic products.

1.1.2 ***"Direct Reuse Soils (DRS Soils)":*** These are soils, or earthen materials, that can be beneficially reused as daily or intermediate cover at a Delaware landfill without requiring thermal or biological remediation to reduce petroleum hydrocarbon constituents. These soils may be considered for other direct beneficial uses, such as road sub-base, fill at a Brownfield site, or for use as landfill cover at an out-of-state site on a case-by-case basis and with prior written approval by the Department. These soils are accepted at the CENC facility solely for physical processing and do not require thermal or biological treatment prior to being sent offsite for beneficial use. These soils will be managed separately at the facility from soils intended for thermal treatment, however, DRS Soils may be combined, following any physical processing, with post-thermally treated soils that have met the facility's criteria for reuse as landfill cover (or other specified reuse, as applicable).

1.1.3 ***"Environmental Due Diligence":*** Investigative techniques, including, but not limited to, visual property inspections, electronic data base searches, review of ownership and use history of property, Sanborn maps, environmental questionnaires, transaction screens, analytical testing, environmental assessments or audits.

1.1.4 ***"Environmentally Inert":*** Means a material that is unaffected by a spill or release of a regulated substance based on information collected during environmental due diligence, or if affected by a spill or release, the concentrations of regulated substances are below Delaware's screening limits for unrestricted use.

1.1.5 ***"Reasonably Expected to be Present":*** When information gathered during environmental due diligence indicates that a chemical contaminant was released or would have been likely to have been released into the environment such that there is a reasonable expectation that it may be found in soils, or other related media from a site.

1.2 Introduction and Current Approved Processes

The focus of this request to modify the facility's operating permit is three fold:

a) The proposed operations will allow the facility to use DRS Soils to supplement the thermally treated soils produced in its existing SRU process to augment CENC's production of treated soils for reuse (particularly landfill cover materials) to meet an increasing demand and stabilize the facility's inventory.

b) The proposed processing of these DRS Soils at CENC will allow the facility to separate and reclaim other aggregate products (such as rock, concrete, etc.) and scrap metal material for further recycling/reuse.

c) This financial benefit to the facility, along with the opportunity to maximize our operations (principally utilizing existing equipment) to serve a broader range of customers, will enhance CENC's ability to compete in an ever increasingly competitive marketplace.

1.3 Proposed New Processes

With the additional capabilities described herein, the CENC facility will have expanded capacity to process DRS Soils that can be beneficially used. The new process operations will use the same equipment that is already in operation at CENC. No new equipment will be used for these operations. The DRS Soils, following screening/processing can be used in a variety of applications, including: landfill daily or intermediate cover, structural fill, road base aggregates, or aggregates used in production of road construction materials such as hot mix asphalt or Portland cement concrete.

A process flow diagram ("PFD") that illustrates the management of DRS Soils at the CENC facility is shown in Appendix I of this Plan. Following testing and/or evaluation to ensure the soils are non-hazardous and do not require thermal or biological remediation prior to reuse, CENC may accept these soils for management under the DRS Soils Program as detailed in Appendix I. The DRS Soils received will be segregated at the site upon arrival and kept inside a barrier that has been installed at the facility (see Site Plan in Appendix I of the GOP). The materials may then be screened to remove/reclaim other recyclable products, mixed with the facility's treated soils to supplement this product, or transferred offsite for direct reuse. These specific operations are discussed in further detail in Section 2.0 below.

1.4 Transition to New Processes

The DRS Soils program will replace the low TPH soil program previously approved and conducted at the facility. Accordingly, the DRS Soils will be managed in the same storage and processing areas of the facility that were previously used to manage low TPH soils destined for beneficial use as landfill cover. As such, there are no transition activities required to implement the DRS Soils program.

1.5 Equipment

CENC will utilize its existing equipment for handling and screening the DRS Soils for beneficial reuse. Equipment is described further in Section 2.1 below. A list of all equipment in use at the facility can be found in Section

1.6 Health and Safety

The management of DRS Soils and the processes that will be added under this permit modification are not expected to present any additional or new hazards to the health and welfare of CENC's facility employees or the surrounding community.

2.0 DIRECT REUSE SOILS PROCESS

This section discusses the process of receiving, handling, and processing of DRS soils into materials for final beneficial use.

2.1 Equipment

The planned DRS soils operations associated with the facility will utilize existing facility equipment and will not require the construction or modification of CENC's fixed operating systems. The existing equipment is described in Section 1.4 of the facility's General Operations Plan. The primary equipment associated with the management or processing of DRS soils is listed below.

- **Extec Screenall, Read CV 40 Deck Screen, or Retech Trommel Screen**-This unit will be used for removing non-processable residues, oversize aggregates and any scrap metal or debris from the DRS Soils. This equipment also produces a consistent particle size to meet final reuse conditions.
- **Extec Convever Unit** – This equipment will be used for transporting or conveying the soil during processing.

- **Caterpillar 950F, Caterpillar 966, and Volvo Wheel Loaders, or the Case Skid Loader** –This equipment will be used for moving or loading the soils into the processing equipment or onto transport vehicles. These units are also necessary to properly manage and stockpile the materials onsite.

Please note, the equipment specified above may be replaced, as needed, by equivalent, or in-kind, equipment/machinery based on mechanical malfunction, intermittent maintenance or service interruptions or when the unit has passed its useful service life.

All equipment associated with this new process will be operated in accordance with the manufacturer's recommendations and guidelines and will be properly maintained in good operating condition. The DRS Soils process handling systems will be segregated from CENC's existing petroleum contaminated soil storage and processing areas, as shown on the Facility Site Plan in Appendix I of the GOP. However, no change in CENC's current facility layout and operating configuration of the SRU management areas is required to implement the use of the DRS Soils handling area. CENC will decontaminate any equipment, such as screening equipment, which was used for handling petroleum contaminated soils before handling the DRS Soils to minimize the potential for cross-contamination.

2.2 Storage

CENC will use the designated DRS Receiving Area (see Site Plan included in Appendix I of the GOP) which is existing facility space for receiving, storing, sorting, screening and blending of the DRS Soils. The DRS Soils Receiving Area will be located in silt fenced lined barriers for containment of any erosion. This receiving area can hold up to approximately 1,500 tons of soil. This area will be separate from the petroleum contaminated soil receiving area. Following receipt, DRS Soils are taken from the receiving area for any additional physical processing (e.g., screening) and subsequently stockpiled in designated storage areas for any additional testing (see Section 3.4) and eventual shipment to an end use site.

CENC has prepared two separate storage bays (DRS Stockpile Area 1 and DRS Stockpile Area 2) for the storage and stockpiling of DRS Soils, after the soils are screened to remove any aggregates and debris. The storage bays are segregated using jersey barriers, portable concrete push walls, or other similar devices to ensure DRS Soils are contained. The two Stockpile Areas are shown on the Facility Site Plan, Drawing SP01, (prepared by Compliance Plus Services, Inc., 08/24/15) included in Appendix I of the GOP. Since portable walls are used to form the stockpile areas, the walls can be moved to allow the facility to change size of the stockpile footprint as needed. Accordingly, as shown in Drawing No. SP1, the two Stockpile Areas may differ in size depending upon the amount of DRS Soils stored at any particular time. This affords the facility the flexibility to respond to changes or fluctuations in market conditions related to the availability of DRS Soils.

The maximum storage capacity of each storage bay area is approximately 4,000 cubic yards (3,000 to 5,000 tons). DRS Stockpile Area 1 is located in an area designated for the remediated soil storage produced from the thermal treatment plant. Since this area is already designed for the storage of soils, no additional engineering controls are needed except the barriers used to separate DRS Soils from the existing thermally treated soil storage. The DRS Stockpile Area 2 will be located on a currently unused portion of property. This Stockpile Area will be surrounded by portable barriers that will be lined with silt fence to control any run-off of sediments or soils from erosion.

2.3 Process Descriptions

A Process Flow Diagram (PFD) that illustrates the procedure for approval, acceptance, processing, and final use of the DRS Soils by CENC is provided in Appendix I of this Module. Provided below is a discussion that details the steps to process DRS Soils as referenced in the PFD. DRS Soils will typically be received in bulk containers (e.g., roll-offs, dump trucks, etc.).

Upon arrival at the CENC facility, the DRS Soils are sampled and inspected in accordance with the waste analysis plan procedures discussed in Section 3.0 below. Once all analytical results indicate the incoming soil meets the acceptance criteria set forth in Section 3.3, the shipment is cleared for offloading into the DRS Soils Receiving Area.

Based on the production planned, the DRS Soils are processed over screens, if necessary, or sorted (either manually or using the material handling equipment) for proper sizing for reuse and removal of non-processable residuals.

Any non-processable residues that are generated during this process will be managed in accordance with the residual materials management procedures specified in Section 2.5 of the facility's General Operations Plan. As referenced therein, these residues will be segregated and sent off site to an appropriate facility for further processing/recycling or disposal within three (3) days, as required under DRGSW 9.4.2.8.1 and 9.4.2.8.2, as described in the GOP in Sections 2.5 of the GOP.

Following screening, the DRS Soils are placed into one of the designated Stockpile Areas, as shown on the Site Plan (Appendix I of the GOP).

Once a sufficient quantity of material is stockpiled in the storage bay, CENC will perform the post processing sampling and analysis as described in Section 3.4 below.

Once the final analysis is complete, and the soils meet all applicable analytical requirements, the processed soils may be either shipped directly offsite for final reuse or the material may be mixed with the thermally remediated soils (that have already been tested and determined to meet applicable reuse criteria) to produce a final product that is acceptable for reuse. (Mixing with the thermally treated soils is principally conducted to meet the geotechnical requirements for the intended reuse, such as providing a consistent particle size for the landfill cover.)

2.4 Residual Materials Handling

Residuals from these materials handling operations, including rock, plastic, wood and other debris, will be managed in accordance with the procedures specified in Section 2.5 of the facility's GOP.

2.5 Final Beneficial Reuse Materials

The primary reuse intended for the DRS Soils is as landfill daily or intermediate cover materials. These materials will supplement CENC's existing remediated soil supply obligations that are already being sent to landfills for reuse.

Any additional reuse of DRS Soils as road base aggregate, structural fill or fill materials outside of landfills will be conducted on a case by case basis, with prior written approval from the Department.

3.0 WASTE ANALYSIS AND CHARACTERIZATION PLAN

The CENC waste analysis and classification plan for DRS Soils is as follows:

3.1 Approval Process for Direct Reuse Soils

An evaluation will be conducted of each incoming DRS Soils to determine if it is acceptable for recycling at CENC as illustrated in the PFD provided in Appendix I of this Module. Generators will be required to provide a completed Non-Hazardous Profile Sheet (see Appendix II of the GOP), as well as any supporting analytical data or information as specified in Section 3.2 below. An approval will be issued through an approval process similar to the current manner that petroleum contaminated waste streams are approved and tracked under the facility's permit. The material will be tracked using the computerized waste tracking system CENC currently utilizes.

Each DRS Soils project will be evaluated based on the information and representations provided by the soil generator. CENC will review the profile information to ensure that the material meets the acceptance criteria set forth in the facility's operating permit. In addition, each project will be required to meet the DRS Soils Approval Criteria specified in Section 3.2 below.

3.2 DRS Soils Approval Criteria

Each proposed new source of DRS Soils will be required to meet the acceptance criteria as outlined in Table 3-1. This analysis will be routinely performed and submitted to CENC for pre-approval as described in Section 3.1 above. On occasion, certain analytical data may be collected following the soil's arrival at the facility as described in the Limited Pre-approval Procedures described in Section 3.2.1 below. Table 3-1 establishes the minimum DRS Soils testing and acceptance criteria that will be applied to all soils accepted under this program. For DRS Soils that will be used as daily/intermediate cover at a Delaware landfill, the acceptance criteria is based meeting the TCLP non-hazardous waste criteria and a PCB concentration of less than 3.0 mg/kg.

If CENC receives a sufficient quantity of soils (e.g., 2,500 to 4,000 tons) from a generator and the same soil profile such that a batch would be solely comprised of this material, CENC may choose to use the analytical data supplied by the generator to represent the process batch and forego the post process sampling and analysis described in Section 3.4 below.

3.2.1 Limited Pre-Approval Procedures

On occasion, CENC receives requests for approval of soil projects where extensive testing has already been completed to properly characterize the soil following testing protocols to comply with state specific site remediation standards and/or to meet the acceptance criteria for another processing or disposal

facility. In these instances, there are frequently sample parameters and/or testing frequencies that do not match CENC's specific approval criteria. The procedures specified below detail the methods CENC may employ to receive the soils based on existing analytical data supplied by the generator and hold final acceptance pending the completion of additional sampling and analysis as conducted by CENC after arrival. The soil managed under these limited pre-approval procedures will remain segregated at the facility until sufficient analysis has been received to ensure the soils meet the facility's acceptance criteria.

All DRS Soils managed under these limited pre-approval procedures will be reviewed to ensure the soils are properly characterized prior to receipt as part of the facility's approval process. Accordingly, these soils must meet the Minimum Incoming Soils Testing Acceptance Criteria for all parameters listed in Table 3-1. Total Petroleum Hydrocarbon (TPH) and/or Total Organic Halogen (TOX) testing will be included as parameters that may be sampled and analyzed for following arrival at the CENC facility, as described below. In addition to the characterization testing data, CENC will utilize the Non-Hazardous Profile Sheet supplied by the soil generator to evaluate materials considered for the limited pre-approval process to ensure that the materials are expected to meet the facility's acceptance criteria.

CENC will implement the limited pre-approval procedures described here for DRS Soils when the pre-approval testing supplied by the generator may be either lacking certain test parameters and/or when the testing supplied does not meet the frequency specified under the pre-approval testing requirements specified in Section 3.1 above. Specifically, these limited pre-approval procedures will be applied to supplement the analysis supplied by the generator with data obtained from analyzing samples collected following arrival at CENC. The pre-approval data supplied by the generator does not include, or does not match the testing frequency, for TPH and/or TOX as required under Table 3-1.

DRS Soils that will be managed pursuant to these limited pre-approval procedures will be delivered to the CENC facility and staged onsite in one of the previously approved storage areas as indicated on the Facility Site Plan Drawing, SP-01, prepared by Compliance Plus Services, Inc., dated 08/24/15. The material will be kept segregated from other incoming soils and properly marked with the staging approval (job) number. Following arrival at the facility, CENC will randomly select an incoming vehicle to collect a sample for analysis. Alternatively, CENC will collect a composite sample from the segregated stockpile of soils staged onsite. The sample collected will be submitted to an independent qualified laboratory to obtain the identified parameters that were omitted, or did not meet the required frequency, from the generator's initial test data. Samples collected will be used to supplement the data until the next sampling interval. At which time, if the project soils are still being received, CENC will collect a sample for the next sampling interval (e.g., 1 sample will be collected and analyzed for each 1000 ton sampling interval).

Upon receipt of the results of the limited pre-approval testing, CENC will review the information and make a final approval and waste acceptance determination for the material. If the analytical results do not meet the DRS Soil criteria, the soil may be considered for acceptance as a TRS Soil. If, in the unlikely event, the results of the analysis indicate that the soil does not meet CENC's permit acceptance criteria, CENC will immediately contact the generator to initiate arrangements to have the soil returned to the generator or sent to an alternate facility selected by the generator.

All DRS Soils received and sampled in accordance with the limited pre-approval testing procedures specified here will also be subject to the acceptance procedures specified in Section 3.3 below.

3.3 DRS Soils Acceptance Procedures

Samples of the incoming material will be collected from trucks arriving at the CENC facility with DRS Soils. CENC will collect one composite sample from each truck load received. For the first 100 tons of soil received (under one approval number), CENC will combine samples from up to two (2) truck loads (or up to 50 tons, whichever is greater), forming one final composite sample, for analysis. One composite sample will be created in the same manner for each 100 tons thereafter. Samples will be and delivered to the CENC on-site laboratory for analysis. The final composite sample will be evaluated to assure the material is consistent with approved parameters for the DRS Soils, and will be tested for TPH, TOX and BTEX. Sample results must be below the following limits to be accepted as DRS Soils (when the DRS Soils will be sent to a Delaware landfill as daily or intermediate cover): TPH ≤1,000 mg/kg, TOX ≤ 10 mg/kg and BTEX ≤10.0 mg/kg. Should the TPH exceed 1,000 mg/kg, the material may be managed under the TRS or BRS program. If not, the load will be immediately rejected and returned to the generator. Any other reuse requires prior written approval from the Department. For additional information on the testing requirements, refer to Table 3-1.

Sampling from the truck body also allows an opportunity to visually inspect a delivery before placing it into storage bunker. CENC will contact the generator if any material is found that does not conform to the approval information to determine if the material is acceptable or rejected. Each load is sampled, analyzed, and confirmed to meet applicable acceptance criteria before the truck driver is instructed to discharge the load in the designated DRS Receiving Area or one of the designated DRS Stockpile Areas as shown on the Facility Site Plan in Appendix I of the GOP. Material that is accepted and requires processing/screening/blending prior to reuse may be moved from the DRS Receiving Area or one of the DRS Stockpile Areas to the screens, as permitted by the process production schedule. The final screened DRS Soils will be placed in either DRS Stockpile Area 1 or Area 2 to await final testing and shipment offsite for reuse.

3.4 Post Processing Analysis

The final materials processed using DRS Soils will be tested using applicable methods in the most current, legal edition of SW-846 Methods. The final material will also meet the specification of the final reuse (i.e., as landfill daily cover, intermediate cover, structural fill, road base, etc.).

3.4.1 Sampling Overview And Assumptions

This Plan describes the sampling and analysis that will be conducted on the processed DRS Soils produced by Clean Earth of New Castle, Inc. (CENC) at their permitted Resource Recovery Facility located at 94 Pyles Lane, New Castle, DE. The purpose of this sampling and analysis is to confirm that the DRS Soils produced by CENC meet the reuse conditions established by both DNREC and the DE Solid Waste Authority for use as intermediate/daily cover material at the Cherry Island Landfill or other written Department approved beneficial reuses. All analysis for reuse will conform with the facility's most current operating permit and the requirements set forth below.

This Soil Sampling and Analysis Plan (SSAP) assumes that the CENC's DRS Soils resource recovery and recycling process produces a product that is relatively consistent and homogeneous. CENC will store its processed DRS Soils in either DRS Stockpile Area 1 or DRS Stockpile Area 2 as designated on the Facility Site Plan in Appendix I of the GOP. These DRS Soil Stockpiles are produced in batches by the facility, generally based on the characteristics of the DRS Soils that are being received at the facility and based on the intended destination reuse location. CENC will collect representative, composite samples of those stockpiles, or batches of soils, that are destined for shipment offsite for reuse. These stockpiles will be segregated from other batches and will be analyzed to ensure that the DRS Soils meet the applicable reuse conditions found in the Post Process Soil Analytical Testing Schedules (included in Appendix V of the GOP

with the exception of the frequency of analysis for TPH, which is tested on inbound soils at the frequency specified on Section 3.3 above). The batch piles will be approximately 2,500 tons to a maximum of 4,000 tons. This batch size is necessary to allow CENC to maintain operational flexibility for its process and to effectively perform the sampling as described in this Plan. However, the sampling size and grid sampling procedure utilized here will still maintain the integrity of the evaluation procedure and ensure that the data objectives for this Soil Sampling and Analysis Plan are achieved.

3.4.2 Batch Sample Collection Procedures

Each batch stockpile will be divided into nine equal grid sectors for sampling as shown in Figure 3.4.A. CENC will randomly collect one discrete sample from each grid sector using an appropriate sampling device(s) (e.g., a sampling scoop, trowel, trier, auger, etc.). When necessary, CENC has loaders and backhoes onsite that can be used to assist the sampler in accessing a portion of the sampling location. Clean Earth will decontaminate any sampling equipment that was used for handling petroleum contaminated soils before handling the DRS Soils to minimize the potential for cross-contamination. The sampling depth and other information related to the sampling event will be recorded on the Treated Batch Sampling Form as shown in Figure 3.4B. Completed forms will be retained by CENC with its operating records for three (3) years and made immediately available for review by DNREC upon request.

An aliquot from each grab sample collected from the individual grid sectors will then be combined and mixed to generate one composite sample for analysis. All samples will be collected, maintained and analyzed in accordance with EPA SW-846 protocols.

3.4.3 Batch Sample Analytical Requirements

For soils that are intended for reuse as landfill cover, each composite sample collected from the post process batch (as described above) will be analyzed for Compounds identified in Schedule 3 of Appendix V of the GOP. For other approved uses, unless otherwise specified by the Department, all sample analysis procedures and reporting/recordkeeping will conform to the requirements established by the particular end user and those set forth in Appendix V of the GOP (with the exception of frequency of analysis for TPH which is tested on inbound soils at the frequency specified in Section 3.3 above). All analysis completed under this program will only be performed by a certified laboratory using EPA approved methods.

Table 3-1

Minimum DRS Soil Testing and Acceptance Criteria

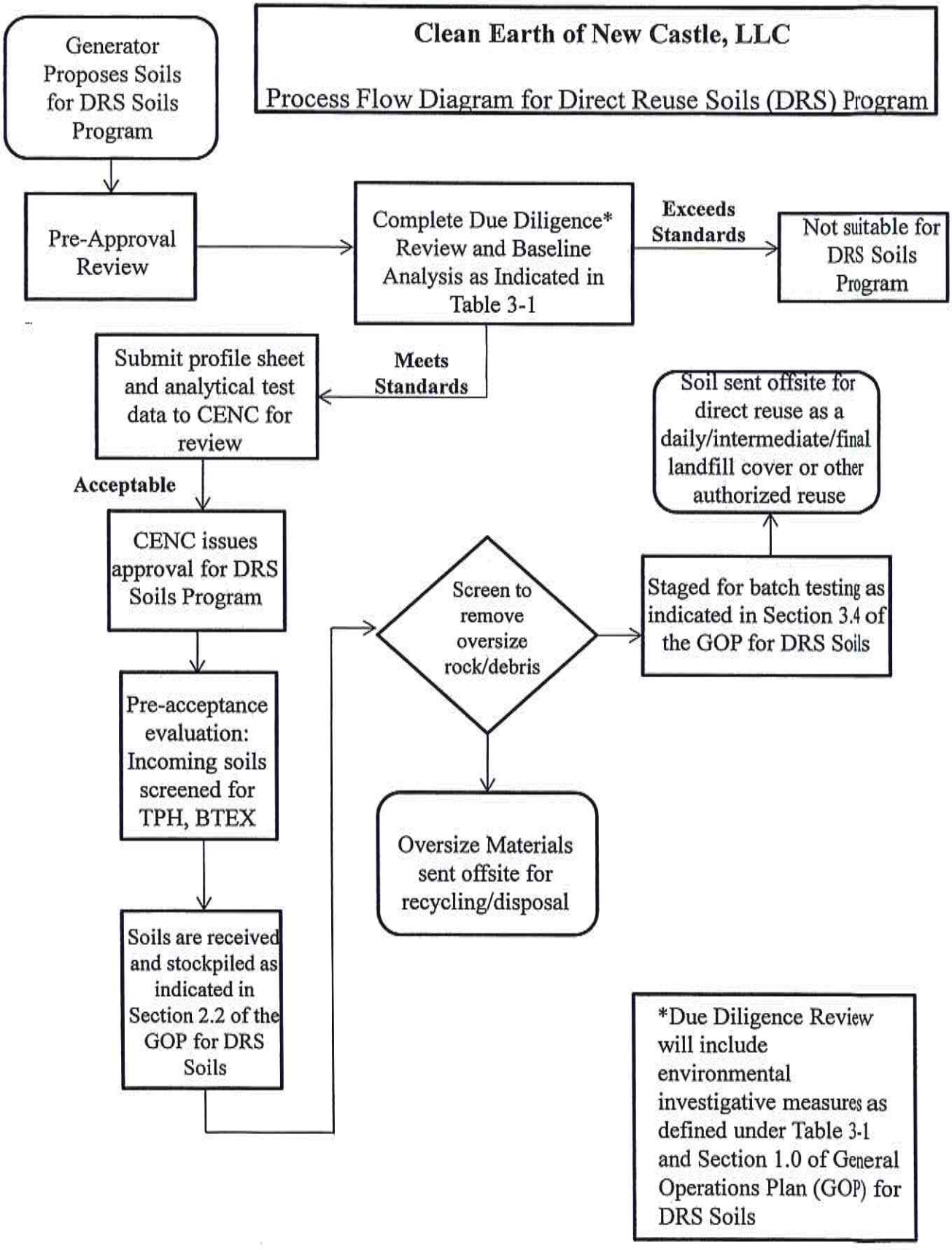
TABLE 3-1: Minimum DRS Soil Testing and Acceptance Criteria	
Requirement	**Acceptance Criteria**
Sampling Requirements*: One representative, composite sample must be obtained and analyzed for every 1000 tons of DRS soils excavated and submitted for approval. Set forth below are the minimum testing criteria for all DRS soils received at CENC. Required Analysis: Each sample must be analyzed for the following parameters:	
☐ RCRA Characteristics (i.e., ignitability, reactivity, corrosivity)	May not exhibit any RCRA hazardous characteristics
☐ TCLP or Total RCRA Metals**	Results must be below RCRA toxicity thresholds (40 CFR 261.24)
☐ BTEX	≤ 10.0 mg/kg total***
☐ Benzene	≤ 0.5 ppm
☐ Toluene	≤ 10 ppm
☐ Ethylbenzene	≤ 5 ppm
☐ Xylene	≤ 5 ppm
☐ Polychlorinated Biphenyls (PCBs)	≤ 3.0 mg/kg total or end use criteria***
*The analytical requirements for small residential projects (less than 100 tons) involving contaminated soils resulting from heating oil or fuel oil tank removals will be limited to TPH analysis only. **A generator certification may be accepted in place of the analytical testing data for pesticides, herbicides, or pyridine based on data collected as a result of environmental due diligence. This exclusion must be approved by CENC's General Manager. If the results of a total constituent analysis for soil is less than twenty (20) times, the applicable TCLP regulatory level for that constituent, of the total analysis result may be used to demonstrate compliance with the TCLP acceptance criteria. ***This acceptance criteria applies to soils that are destined for reuse at a Delaware landfill for daily or intermediate cover. An alternate acceptance limit for PCBs may be established, with prior written approval by the Department, based on the approved limit of the end use location where the soils will be placed. Higher concentration of PCBs may only be accepted when the source of contamination is unknown and the waste does not meet the definition of a PCB Remediation Waste, as defined in 40 CFR 761.3.	***

Additional Information Required: Generators will be required to provide a Non-Hazardous Profile Sheet and Non-Hazardous/DRS Soil Waste Certification prior to approval for acceptance at CENC. **No soils**

destined for reuse at a Delaware landfill for cover will be accepted from any State Superfund site (which include HSCA, VCP and Brownfield sites) or federally identified Superfund sites.

Appendix I

Process Flow Diagram for
Direct Reuse Soils ("DRS") Program


Clean Earth of New Castle, LLC
Process Flow Diagram for Direct Reuse Soils (DRS) Program
Generator Proposes Soils for DRS Soils Program
Pre-Approval Review
Complete Due Diligence* Review and Baseline Analysis as Indicated in Table 3-1
Exceeds Standards
Not suitable for DRS Soils Program
Meets Standards
Submit profile sheet and analytical test data to CENC for review
Acceptable
CENC issues approval for DRS Soils Program
Pre-acceptance evaluation: Incoming soils screened for TPH, BTEX
Soils are received and stockpiled as indicated in Section 2.2 of the GOP for DRS Soils
Screen to remove oversize rock/debris
Oversize Materials sent offsite for recycling/disposal
Staged for batch testing as indicated in Section 3.4 of the GOP for DRS Soils
Soil sent offsite for direct reuse as a daily/intermediate/final landfill cover or other authorized reuse
*Due Diligence Review will include environmental investigative measures as defined under Table 3-1 and Section 1.0 of General Operations Plan (GOP) for DRS Soils

Operating Module 2

Management Procedures for Non-Hazardous Recyclable Materials ("NHRM") Processing Systems

Operating Module 2

Management Procedures for Non-Hazardous Recyclable Materials (NHRM)

Clean Earth of New Castle, Inc.
94 Pyles Lane, New Castle, Delaware 19720

Revised November 2016
Document Control Number: CEI-212-004 (Rev. 9, 11/16)

Prepared by:
Compliance Plus Services, Inc.
P.O. Box 186 Hatboro, PA 19040
(215) 734-1414 or (866)976-PLUS

Project Number: 0150.0799.02

Table of Contents

Figures:

Tables:

Appendices:

Operating Module 2

Management Procedures for Non-Hazardous Recyclable Materials (NHRM)

1.0 Management Procedures for Non-Hazardous Residual Material (NHRM)

This Operating Module describes the procedures and processes that will be used to manage a variety of NHRM's for beneficial reuse and to supplement the existing recycling/recovery operations conducted under the General Operations Plan for Thermal Remediation and Recovery of Petroleum Hydrocarbon contaminated soils. The beneficial reuse of these NHRM's allows CENC to divert these materials, which would otherwise be sent out for land disposal as a solid waste.

1.1 Introduction and Current Approved Processes

CENC is currently permitted to accept non-hazardous recyclable materials (NHRM) for use as soil amendments. Accordingly, NHRM's are used at the facility to cool and rehydrate the hot soils exiting the thermal treatment unit to supplement or replace the use of the potable water currently used at the plant. In addition, the amendment of the thermally treated soils with NHRM's returns nutrients and organic content to the processed soil to improve its reuse. While the process of using NHRMs as soil amendments has been authorized, CENC is required to submit each new category or classification of NHRM to the Department for approval on a case-by-case basis as described in Section 5.0 below. CENC must demonstrate to the Department in accordance with Section 5.1, that the new NHRM is an acceptable material and the purposed sampling frequency and analytical parameters that will be formalized for any NHRM's that conform with this classification or category of NHRM. CENC may not accept any NHRM until after the Department has granted written approval. Any NHRM approval and subsequent use will be in accordance with this Operating Module.

The acceptance of any NHRM material is on a case-by-case basis and subject to the Department's approval. Any NHRM material destined for a facility within the State of Delaware is subject to the SIRS reporting limits. When the reuse is not within the State, the constituent concentration for the other authorized uses will be based on the end users requirements and any applicable regulatory provisions of the jurisdiction where the soils will be placed or used.

1.2 NHRM Processes

The solid and semi-solid NHRM operations will use much of the same equipment that is already in operation at CENC. New equipment (see Table 1-4 of the General Operations Plan) that will be used for these operations are expected to include the addition of a NHRM feed-hopper and conveying equipment. The remediated soils amended with NHRMs can be used in a variety of applications, including: landfill daily or intermediate cover, structural fill, road base aggregates, or aggregates used in production of road construction materials such as hot mix asphalt or Portland cement concrete. The primary NHRMs used for soil amendments include, but are not limited to: bio-solids (e.g., chicken manure), lime filter cakes, coal ash, paper pulp, water treatment solids and dredge spoils. These materials may be blended with each other and CENC's thermally remediated soils to create the final usable amended soils. In addition, these materials may also be added to the hot soils exiting the SRU to add moisture to the soils directly in the mixer/cooler unit for complete fugitive dust control and optimum soil moisture content. These specific recycling processes are discussed in greater detail in Section 2.0 and 3.0 of this Operating Module.

The CENC facility will also be capable of using non-hazardous water-bound waste (WBW) NHRMs as a cooling medium when the CENC facility is thermally treating non-hazardous petroleum contaminated soils. The WBW's will be injected into the mixer/cooler unit of the plant in the same manner as used to deliver potable cooling waters.

The WBW NHRMs will be maintained in storage tanks that will be installed prior to commencing NHRM operations. These specific operations are discussed in further detail in Section 4.0 below.

1.3 Transition to NHRM Processes

Subsequent to the Department's approval of individual classifications or categories of NHRMs for use at the facility, as described in Section 5.1 below. CENC will commence with the required construction and facility preparations to begin managing the NHRM's in accordance with the construction schedule described in Section 6.0 below. CENC expects to complete the majority of the required facility preparations and construction while current CENC operations continue uninterrupted. The proposed construction schedule provides that each process for the NHRM's will be brought online in two

phases. As each phase of construction is completed, CENC will notify the Department in writing at least two weeks prior to commencing the operation of the new NHRM process.

Prior to the installation of the new NHRM storage areas and process equipment, CENC may propose to submit a NHRM for acceptance for a temporary period under a research and development (R&D) authorization. Under this R&D authorization, CENC may propose to accept a NHRM material at the facility on a limited basis to test the material handling and processing logistics on a small scale. The R&D authorization request submitted by CENC will include the information required under the NHRM classification code approval requirements outlined in Section 5.1 below. In addition, this submission would propose a quantity limitation and duration period to complete the R&D review. The NHRM would be managed in containerized units (e.g., in a 250 gallon tote, a 5,000 gallon tank truck, etc.) in the Temporary Staging Area for NHRM materials as shown on the facility site plan. Appropriate processing and handling details would also be provided to the Department for review and approval as part of the R&D authorization request. This process will allow CENC to accept and handle limited quantities of a new NHRM under a controlled process prior to accepting the material for full production level handling. CENC will not accept any NHRMs prior to the issuance of written approval by the Department.

1.4 Equipment

CENC expects to utilize much of its existing equipment in conjunction with new conveying and mixing devices in order to process the various proposed NHRM's into amended soils for beneficial reuse. A description of the facility's operating equipment is provided in Section 1.4 of the facility's General Operation Plan.

All equipment associated with the NHRM processes will be operated in accordance with the manufacturer's recommendations and guidelines and will be properly maintained in good operating condition. All NHRM process feed systems will be integrated into CENC's existing process in such a way that CENC will retain the current configuration and components of the SRU.

2.0 Solid NHRM Process

This section discusses the process of receiving, handling and adding solid NHRM's into soils for beneficial reuse. As previously described above, these NHRM's may also be utilized to cool thermally treated soils from the SRU. Additionally, the amendments will raise the organic content of the final remediated soil for better environmental integration with native soils when used as fill material.

2.1 Waste Types

The types of solid NHRM's that will be used as the primary inert feed ingredients for making the amended soils includes, but is not limited to, the materials listed below. The general value or benefit derived from each soil additive or soil amendment ingredient is also discussed for each NHRM listed below.

1. Previously remediated soils from CENC's SRU

2. Bio-solids – these materials add moisture to re-hydrate and cool CENC's thermally treated soils. In addition, these solids add organic nutrients back into the soils.

3. Lime filter cakes – these materials add minerals and provide moisture to re-hydrate and cool the soils from the SRU. In addition, the alkalinity value from the lime helps to stabilize the soil pH to facilitate biological activity.

4. Coal ash – this material adds nutrient minerals to the remediated soils as well as particle size variability to the amended soils produced by CENC. This allows the facility to vary the geophysical characteristics of the soils for compaction, drainage, etc. to meet end use requirements. CENC will not accept coal ash from the Conectiv Edge Moor Plant in accordance with the December 19, 2003 response letter to public hearing comments from Michael D. Logan, Compliance Plus Services, Inc. to Rod Thompson, Hearing Officer, DNREC.

5. Paper pulp – this material provides moisture to re-hydrate and cool the soils from the SRU. In addition, these solids add organic nutrients back into the soils.

6. Water treatment solids – these materials add moisture content, organic nutrients and nutrient minerals to the amended soils.

7. Dredge spoils – these materials add moisture content, organic nutrients and mineral value to the amended soils.

8. Solids from Stormwater retention ponds (including from CENC's site) – these materials add moisture content, organic nutrients and mineral value to the final amended soils.

2.2 Equipment

The equipment that will be utilized for handling and management of NHRM solids is detailed below. For additional information related to equipment specified here, refer to Section 1.4 of the General Operations Plan.

- Portable deck screen, bar screen, or similar device for removing non-processable residues and sizing NHRM solids to proper size for feeding units or end products
- Conveyers for transporting soil during process
- NHRM feed bin to control rate of addition of NHRM to soil to process
- Front-end loader, or similar equipment, for materials handling
- Soil Remediation Unit (SRU) mixer/cooler system

2.3 Storage

CENC will use the existing Quonset Hut storage structure as a receiving, storage and sorting/screening area for the solid NHRM's. CENC will prepare the Quonset Hut storage area, after removing any soils in storage and washing (decontaminating) the floor of the unit, for these operations (see Section 6.0 for the construction/installation schedule for these activities).

As illustrated in *Figure 2-1*, the various types of NHRM's will be segregated into storage bays within the Quonset Hut based on the specific nature or physical characteristics of the materials and their intended use in the process. The storage bays will be segregated using jersey barriers, portable concrete push walls, or other similar devices. The Quonset Hut will be divided into three areas: 1) a storage section (Bays 1-5) for incoming materials and materials that have been pre-processed (screened/segregated) and are waiting to be fed into the process as described in Section 2.4 below; 2) a screening station/work area where the NHRM solids are pre-processed to remove stone, rock and other non-processable solids; and 3) a final staging area (Bay 6) where CENC can prepare the final batch of NHRM material that will be used to amend the SRU soils.

Please note that the storage bays indicated in *Figure 2-1* are formed with portable walls to allow the facility to combine or consolidate bays, as needed, when they hold like or similar materials. This affords the facility the flexibility to respond to changes or fluctuations in market conditions related to the availability of any particular NHRM(s).

CENC will maintain suitable aisle space, as shown, within the Quonset Hut to allow material handling equipment to access the various storage bays. The maximum storage capacity of the Quonset Hut is approximately 3000 cubic yards. The structure of the Quonset Hut will remain the same after this change in service to a storage/processing area for solid NHRM's. However, CENC will be installing plastic strips/covers (or other equivalent cover) to close off the eastern and western ends of the structure (these are currently open). This installation is intended to provide a barrier to minimize fugitive dusts and odors from exiting the Quonset Hut. A portion of the western end of the Quonset Hut will remain open to continue to allow vehicles and equipment to enter and exit.

2.4 Process Descriptions

A Solid Wastes Processing (SWP) Process Flow Diagram (PFD) that illustrates the processing and use of the solid NHRM's by CENC is provided in *Appendix I* of this Operating Module. Provided below is a discussion of the process steps as shown in the SWP-PFD.

Solid NHRM's are received in both bulk containers (e.g., roll-offs, dump trucks, etc.) and non-bulk (e.g., drums, boxes, etc.) containers.

Upon arrival at the CENC facility, the NHRM's are sampled and inspected in accordance with the waste analysis plan procedures discussed in Section 5.0. Once a determination is made that the material conforms with the pre-acceptance information provided, the shipment is cleared for off loading into the solids storage area.

2.4.1 Based on the facility's planned production activities, the NHRMs are pre-processed over screens, if necessary, or sorted (either manually or using the material handling equipment) to ensure that the material is properly sized for processing and that non-processable residuals are removed.

2.4.2 Any non-processable residues that are generated during this process are segregated and sent off site to an appropriate facility for further processing or disposal, as described in Section 2.5 of the facility's General Operations Plan.

2.4.3 The solid NHRM's may be used as bulking/blending agents in the semi-solids processing unit (see Section 3.0 below). This process is used to stabilize or solidify the semi-solid NHRM's for improved material handling and processing. The solid NHRM's are processed using one of the procedures described below.

2.4.3.1 Solid NHRM's may be transferred directly into the semi-solids concrete containment unit for blending/mixing with the semi-solid NHRM's. The blending/mixing will be performed directly in the containment unit backhoe or excavator. This procedure is further discussed in Section 3.4 below.

2.4.3.2 Alternatively, CENC can blend or mix solid NHRM's with semi-solid NHRM's using the live bed NHRM feed hopper near the SRU Plant as shown in the Facility Site Plan.

Both the solid and semi-solid NHRM's are transferred into the live bed NHRM feed hopper where the materials are mixed together and discharged to a conveyor belt. The final discharge from the live bed NHRM feed hopper conveyor will drop into the mixer/cooler of the SRU for final blending with the remediated soils as described in 2.4.4 below.

2.4.4 Solid NHRM's (or the resultant mixtures as discussed in 2.4.3.2 above), that will be used to cool, rehydrate and/or amend the remediated soils from the SRU, will be transferred and placed into the NHRM feed hopper located near the SRU as shown on the Facility Site Plan in Appendix 1 of the facility's General Operations Plan. The conveyor from the NHRM feed hopper will deposit the NHRM into the mixer/cooler of the SRU. The NHRM materials are subsequently blended into the hot soils being discharged from the thermal treatment system. CENC can meter the addition of the NHRM's into the remediated soils. The final blended soils are discharged from the mixer/cooler to the radial stacker and staged in the finished aggregate stockpile. The final storage pile (not to exceed 4,000 tons) is subsequently sampled and analyzed, as specified in Section 5.0 below, to determine if the material meets the appropriate reuse requirements.

2.4.5 Once the final analysis is complete, the amended soil may be shipped off site for final beneficial reuse.

2.5 Final Beneficial Reuse Materials

The reuses of the amended soils may include, but are not limited to:

- Road base fill
- Topsoil supplement
- Landfill daily or intermediate cover
- Structural and non-structural fill

3.0 Semi-solid NHRM Process

This section discusses the process of receiving, handling and amending semi-solid NHRM's into materials for beneficial reuse. As previously described above, these NHRM's may also be utilized to cool thermally treated soils from the SRU. Additionally, the amendments will raise the organic content of the final soil for better environmental integration with native soils when used as fill material.

3.1 Waste Types

The types of semi-solid NHRM's that will be used as the primary feed ingredients for making the amended soils include, but are not limited to, the materials listed below. These NHRM's are similar to those identified for the NHRM solids discussed in Section 2.0 above. These semi-solid materials generally vary only in their total moisture and solids content from their solid counterparts discussed in Section 2.1. The general value or benefit derived from each of the NHRM's identified below are the same as discussed in Section 2.1.

1. Bio-solids – these are principally sewage sludges with less than 25% solids content. Although these materials have been treated to meet Class A or Class B criteria, the pathogen reduction method has not removed a substantial portion of the moisture content. These materials add moisture to rehydrate and cool CENC's thermally treated soils and provide organic nutrient replacement.

2. Lime filter cake sludge –Materials with solids content typically less than 30%. Provides same beneficial value as lime filter cake solids listed in 2.1: a source of moisture or rehydration; adds minerals and nutrients to soils; and provides alkalinity to stabilize soil pH.

3. Paper pulp sludge – These are filter cake sludge or lagoon/tank bottoms that have greater than 65% - 70% moisture remaining in the waste. These materials provide moisture content for rehydration and organic nutrients to facilitate plant growth and biological activity.

4. Water treatment plant sludges – These are solids generated from filtering or settling/clarification units that still contain over 65% - 70% moisture. These benefit CENC's remediated soils by 1) adding moisture for hydration and cooling; and 2) adding

organic and mineral nutrients back into the soils to promote plant/vegetative growth and microbial activity.

5. Dredge spoils (less than 25% solids) - these materials add moisture content, organic nutrients and mineral value to the amended soils.

6. Semi-solids from stormwater retention ponds (including from CENC's site) - these materials add moisture content, organic nutrients and nutrient minerals to the amended soils.

3.2 Equipment

- Feed bin for controlling process rates
- Conveyors for transporting soil during process
- Screen for sizing sorting feed material to proper size for end use
- Bucket loader for materials handling
- Mixer/Cooler unit at the SRI Plant

3.3 Storage

A concrete containment unit, as detailed in the engineering drawing number *SP1* prepared by Busch Engineering (provided in the facility's General Operations Plan, Appendix I), will be used to store semi-solid NHRM received by CENC. The interior surface of the concrete containment walls and storage unit floor will be coated with a high solids epoxy paint to ensure that liquids are not released or do not permeate the concrete resulting in a release from the unit. The MSDS for the epoxy paint will be submitted to DNREC prior to its application. In addition, the unit will have a cover, free of gaps or holes, made of metal or tarpaulin material to ensure that the unit will be covered when NHRM is not being added or removed or during precipitation events. The cover is also intended to minimize fugitive dusts or odors from being released into the atmosphere. The storage capacity for this containment unit is approximately 106 cubic yards of semi-solid NHRM's.

In addition, a 30 mil high density polyethylene liner will be installed under the concrete tank. This underlying liner system will be equipped with a leachate collection unit or pump. CENC will submit final detail construction design information to the Department for approval prior to implementation of the Phase II construction elements of the facility modifications as detailed in Section 6.3.

3.4 Process Descriptions

A Semi-Solid Wastes Processing (SSWP) Process Flow Diagram (PFD) that illustrates the intended processing and use of the solid NHRM's by CENC is provided in *Appendix II* of this Operating Module. Provided below is a discussion of the process steps as shown in the SSWP-PFD.

Semi-solid NHRM's are received in both bulk containers (e.g., roll-offs, dump trucks, etc.) and non-bulk (e.g., drums, boxes, etc.) containers. Upon arrival at the CENC facility, the NHRM's are sampled and inspected in accordance with the waste analysis plan procedures discussed in Section 5.0. Once a determination is made that the material conforms with the pre-acceptance information provided, the shipment is cleared for off loading into the semi-solids concrete containment unit.

3.4.1 Based on the facility's planned production activities, the NHRM materials are processed over screens, if necessary, or sorted (either manually or using the material handling equipment) for proper sizing and removal of non-processable residuals, any liquids which may separate out during storage of these semi-solid materials may be decanted or pumped to the WBW storage tanks.

3.4.2 Any non-processable residual materials that are generated during this process are segregated and sent off site to an appropriate facility for further processing or disposal, as discussed in Section 2.5 of the facility's General Operations Plan.

3.4.3 After screening and/or sorting, the semi-solid NHRMs may be pre-processed with solid NHRMs to stabilize or solidify the material for improved handling and processing. Although CENC may perform this pre-processing using commercially available drying agents such as these described in Section 2.4 of the General Operations Plan, the preferred method is to use the source of Solid NHRM's that are already stored at the facility. The bulking/blending of the semi-solid NHRM's with the solid NHRM's (or the soil drying agents discussed above) will be accomplished using one of the processing alternatives described below. Following the pre-processing of the semi-solid NHRM, they are segregated for transfer to the appropriate process area.

3.4.3.1 Solid NHRM's may be transferred directly into the concrete containment unit where the semi-solid NHRM's are stored. The materials will be

mixed directly in the Containment Unit using a back hoe or excavator. Once the material has been adequately mixed, the resultant mixture will be transferred for final processing as described in 3.4.4 below.

3.4.3.2 Alternatively, CENC can blend or mix solid NHRM's with semi-solid NHRM's using the live bed NHRM feed hopper unit near the SRU plant as shown in the Facility Site Plan included in Appendix I of the General Operations Plan.

Both the solid and semi-solid NHRM's are transferred into the live bed feed hopper where the materials are mixed together and discharged to a conveyor belt. The final discharge from the live bed feed hopper conveyor will be deposited into the mixer/cooler of the SRU for final blending with the remediated soils as described in 3.4.4 below.

3.4.4 The semi-solid NHRM's (or the blended mix or semi-solid and solid NHRM's) will be used to cool, rehydrate and/or amend the remediated soils from the SRU. These materials will be transferred and placed into the NHRM feed hopper located near the SRU as shown in the Facility Site Plan included in Appendix 1 of the General Operations Plan.

The semi-solid NHRM's (or blended mix) will then be conveyed from the NHRM feed bin to the mixer/cooler for processing with the hot remediated soils exiting the rotary dryer. After blending with the soils in the thermal cooling section of plant, the soil mixture is discharged to the radial stacker and placed in a final amended soil storage pile. The final storage pile, not to exceed 4,000 tons, is subsequently sampled and analyzed, as specified in Section 5.0 below, to determine if the material meets the appropriate reuse requirements.

3.4.5 Once the final analysis is complete, the amended soils may be shipped off site for final beneficial reuse.

3.5 Final Beneficial Reuse Materials

The reuses of the amended soils include, but are not limited to:

- Road base fill

- Topsoil supplement
- Landfill daily or intermediate cover
- Structural and non-structural fill

4.0 Water-Bound Waste Process (WBW)

This section discusses the process of receiving, handling and amending WBW NHRM's into materials for beneficial reuse. As previously described above, these NHRM's will also be utilized to cool thermally treated soils from the SRU. Additionally, these NHRMs will raise the organic content of the final amended soil for better environmental integration with native soils when used as fill material.

4.1 Waste Types

The primary water-bound waste materials include, but are not limited to, liquids from the following sources:

1) Bio-solids
2) Paper pulp
3) Water treatment plant sludge
4) Dredge spoils
5) Stormwaters collected from CENC's retention basin and secondary collection systems

4.2 Equipment

The facility equipment that will be utilized to handle and manage, WBW NHRM's is detailed below. Additional information related to the facility equipment specified here is provided in Section 1.4 of the facility's General Operations Plan.

- Storage Tanks (3) each with holding volume of 12000 gallons
- Pumps capable of 50 gallons per minute minimum.
- Metering device to control flow of WBW
- Mixer/Cooler unit of the SRU

4.3 Storage

CENC will install storage tanks placed within a containment area constructed of concrete with walls 3 feet high. This will provide sufficient containment to hold the entire volume of one tank, plus 10 percent for contingency. The interior concrete surface of the containment system will be coated with a high solids epoxy paint to ensure that the

system is watertight. CENC will submit the MSDS for the epoxy paint to the Department prior to its application.

In addition, CENC will also install an off-loading area for tanker trucks. This off-loading area is a concrete containment system equipped with containment berms that are six inches high at the front entrance and increase to three feet high at the rear wall of the unloading area. The surface of the concrete floor and walls of the containment system will be coated with a water-proof epoxy resin to prevent migration of any leaks/spills that occur on the unit. CENC will submit the MSDS for the epoxy paint to the Department prior to its application. The tanker unloading area is sloped toward the rear wall to provide sufficient containment to hold the entire contents of a tank truck (max. 6,000 gallons), plus 10 percent. Design details and drawings of the tank storage and truck unloading areas are provided in Appendix I of the facility's General Operations Plan.

4.4 Process Descriptions

A Water-Bound Wastes Processing (WBWP) Process Flow Diagram (PFD) that illustrates the processing and use of the liquid NHRM's by CENC is provided in *Appendix III* of this Operating Module. Provided below is a discussion of the process steps as shown in the WBWP-PFD.

Water-Bound NHRM's are received in both bulk containers (e.g., tanker trucks, etc.) and non-bulk (e.g., drums, totes, etc.) containers. Upon arrival at the CENC facility, the NHRM's are sampled and inspected in accordance with the waste analysis plan procedures discussed in Section 5.0. Once approval is received, the shipment is cleared for off loading into the WBW storage area. Tanker trucks and vacuum tankers are unloaded on the concrete unloading pad using portable diaphragm pumps or the pump units available on the transport vehicle. Non-bulk containers will also be emptied using portable diaphragm pumps in the truck unloading area. The containers will either be placed directly on the pad for unloading or they may be pumped out while on the transport vehicle (e.g., open-sided flat bed).

The container/truck unloading pad for the WBW storage area provides sufficient containment in the event of a spill or release from any containers that may be staged in this area during unloading operations. The containment area also includes a 2 ft. by 2 ft. by 3ft. deep sump for the collection of any liquids that may accumulate in this area, including incidental leaks or spills and any accumulation of rainwater. CENC will maintain a fixed pump in the collection sump to remove accumulated liquids from this

storage/staging area. Operators will inspect the sump area prior to staging vehicles or containers in this area to ensure that any accumulated liquids have been removed.

Any accumulated liquids from this area will be pumped directly into the WBW storage tanks for use in the plant. Alternatively, uncontaminated rainwater (determined based on a visual inspection of the unloading area) may be directed (pumped) to the runoff holding pond as needed. In the case of catastrophic release, such as from a ruptured tank truck for example, CENC may use the portable double diaphragm pumps that are maintained in this area to transfer the spilled material into another suitable container(s) until arrangements are made to remove the material offsite or reuse it onsite as a WBW. In the case of a release, CENC shall immediately notify the Department at 1-800-662-8802, in accordance with 7 Del. C §6028. In the case of a spill outside the permitted containment area, but not qualifying as a reportable release under 7 Del. C §6028, CENC shall notify the SHWMB within 24 hours.

Materials being used in the cooling process of the thermal plant (SRU) are conveyed via secure, dedicated piping, from the storage tanks to the mixer/cooler discharge or to the mixer/ cooler for processing. All liquid transfer piping that is not contained within the storage tank containment system will be constructed of double walled piping. This double walled piping will be inspected weekly as part of the facility inspections conducted in accordance with Section 4.0 of the facility's General Operations Plan.

After amending the treated soils in the mixer/cooler with water-bound waste, the soils are transferred through the radial stacker creating a final amended soil storage pile, not to exceed 4,000 tons, for final testing. Once the final analytical results are received and determined to be acceptable for reuse as discussed in Section 5.0 below, the soils are shipped off site to an appropriate facility/site for reuse.

4.5 Final Beneficial Reuse Materials

The reuses of the amended soils include, but are not limited to:

- Road base fill
- Topsoil supplement
- Landfill daily or intermediate cover
- Structural and non-structural fill

5.0 Waste Analysis and Characterization Plan

The CENC waste analysis and classification plan for non-hazardous recyclable materials (NHRMs) is described below. The steps in this process are diagrammed in *Figure 5-1* for the sake of clarity. Prior to the first time that CENC handles any new NHRM class (i.e., any of the individual waste types listed in Sections 2.1, 3.1 and 4.1 above) the facility will trigger the new NHRM Classification Code Approval process. This process is described in 5.1 below and includes an internal review followed by a submission to the Department for approval. Anytime CENC identifies a new NHRM class/type, this process will be triggered.

Subsequent to approval of a new NHRM Classification Code, each new generator that wishes to bring in a waste that meets this NHRM Classification Code will be subject to the approval procedures described in Section 5.2 below. This approval process is limited to a facility review of the information and data supplied by a generator, which is then compared to the approval requirements specified for that Classification Code.

This section also discusses the general waste analysis requirements related to pre-approval, pre-acceptance and post-treatment testing for the general class/types of NHRM's that have been tentatively identified. All analytical requirements must be approved by the Department in writing prior to the addition of a new NHRM Classification Code and acceptance of a new NHRM. In addition, there is a provision to add analytical testing for additional compounds which may be identified as analytes of concern during the NHRM approval process.

5.1 New NHRM Classification Code Approval

A review will be conducted of each particular waste type/class that is submitted to CENC from a generator to determine if the material conforms to an existing NHRM Classification Code. To complete this review, each generator is required to submit a Non Hazardous Waste Profile Sheet (see *Appendix* III of the General Operations Plan) along with any applicable data. If, after reviewing the Profile Sheet, CENC determines that the NHRM constitutes a new classification code, CENC will review the material to assess its value and approval criteria both at the facility level and conduct a secondary review by a company management official or corporate compliance representative. If the material is found acceptable and adds value to CENC's processing, CENC will compile a general approval package for the new NHRM, which includes completing a Non Hazardous

Recyclable Materials Classification Code Form, and submit it to the Department for approval. Upon receipt of the Department's written approval, CENC will assign a Waste Classification Code for the NHRM. All subsequent generator submissions and approvals can be granted under this NHRM Classification Code. This NHRM material, and any subsequent generators submitting materials for approval under this Classification Code must follow the individual waste stream approval procedures outlined in Section 5.2, below.

5.2 Approval Process for Existing NHRM Classification Code

After CENC determines that the NHRM meets an existing Classification Code, or that a new code approval has been granted by the Department, CENC will conduct an evaluation (re-evaluation) of each incoming NHRM material to determine if it is acceptable for processing at CENC. This evaluation will include a review of the generator's Profile Sheet and the pre-acceptance/pre-approval sampling and analysis as prescribed under Section 5.3 below, in addition to any analytical requirements set forth in the Department's NHRM classification code approval. If acceptable, an approval number will be issued by CENC through an approval process similar to the one used for hydrocarbon waste streams. The NHRM will be tracked using a computerized waste tracking system similar to CENC' s existing system. Consistent results will allow the incoming material testing frequency to be reduced, with written approval from the Department.

At a minimum, annual testing and re-certification will be done on each approval granted, if the waste stream is ongoing.

5.3 Pre-Approval Sampling and Analysis

The minimum pre-acceptance analysis that will be required for each NHRM classification prior to approval at CENC are provided below. Additional testing may be identified during the initial review process. The analytical testing parameters listed for each NHRM classification must be completed as follows: 1) prior to approval; 2) on an annual basis following initial approval; and 3) whenever there is a change in the process generating the waste that would affect the NHRM.

As referenced in Section 5.0 above, the Department may add analytical testing requirements for additional sampling frequencies or compounds which may be identified as analytes of concern during the NHRM approval process. The following analyses are required, but not limited to:

5.3.1 INCINERATOR ASH - COAL FLY ASH, WTE PLANT RESIDUES

- TCLP metals,
-Total RCRA metals, plus Zinc and Nickel
-Ignitability, reactivity and corrosivity
-TOX
-PCB's

5.3.2 NON-HAZARDOUS INDUSTRIAL SLUDGE AND FILTER CAKES

- TCLP metals,
-Ignitability, reactivity and corrosivity
-TOX
-PCB's

5.3.3 BIO-SOLIDS

- TCLP metals
-Ignitability, reactivity and corrosivity
-TOX
-PCB's

5.3.4 DREDGE SPOILS

- TCLP metals
-Ignitability, reactivity and corrosivity
-TOX
-PCB's
-2,3,7,8 TCDD (dioxin)
-Total RCRA metals, plus Nickel and Zinc

5.4 Incoming Load Sampling and Verification

A representative, composite sample of the incoming material will be collected from each truck/container of NHRM arriving at the CENC facility and delivered to the CENC on-site laboratory. The sample will be evaluated according to the written approval issued by the Department. Sampling from the truck body/container also allows an opportunity to visually inspect a delivery before discharging into storage bunkers. If the load does not meet the acceptance criteria, CENC will contact the generator if any material is found that does not conform to the approval to resolve any discrepancies and if necessary reject the shipment.CENC will notify the SHWMB within 24 hours of any shipment being rejected.

If, after acceptance, CENC determines the NHRM are unacceptable, CENC must notify the SHWMB immediately with the reason for rejection and the NHRM shall be removed from the CENC facility within 72 hours unless otherwise authorized by the Department.

If the NHRM is determined to be a hazardous waste, CENC shall contact the SHWMB immediately and remove the NHRM within 72 hours, unless otherwise authorized by the Department. All removal and disposal shall comply with all applicable sections of Delaware's Regulations Governing Hazardous Waste (DRGHW). A copy of the hazardous waste manifest used to represent the shipment offsite shall be submitted to the SHWMB and a copy shall be maintained by CENC on-site for three (3) years and made immediately available for DNREC review upon request.

Each load is sampled and approved before the truck driver will be instructed to discharge the load in a designated non-hazardous recyclable material storage area or tank, as specified on the Site Plan found in Appendix I of the facility's General Operating Plan. Material that is accepted for processing is designated as such and may be moved to the process feed as required by the process production schedule.

5.5 Post-Processing Analytical Requirements

The final amended soils processed using NHRM as an ingredient will be tested using the approved methods found in the most recent, legal edition of EPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" EPA SW-846 or an equivalent method as approved by the Agency in writing. The parameters selected do not change the testing requirements currently used by the CENC facility for the remediated soils, which are already approved by the Department. Any analytical testing required as a result of the addition of the NHRM's will be in addition to the post-processing analytical

requirements in the facility's current operating permit and discussed in Section 3.4 of the General Operations Plan for Thermal Remediation and Recovery of Petroleum Contaminated Soils.

The final amended soils are processed to ensure that the material [maf1]meets the specification of the end user (e.g, landfill daily cover, intermediate cover, structural fill, road base, etc.). The final amended soils will be stored in interim stockpiles, not to exceed 4,000 tons, in the Finished Pile Storage Area, as indicated on the facility's Site Plan included in Appendix I of the facility's General Operations Plan. The amended soil batch pile will be sampled and tested to ensure that the appropriate product specifications and analytical parameters as found in Schedules 1, 2, and 3 are met.

5.5.1 AMENDED SOIL BATCH SAMPLING REQUIREMENTS

CENC will stage and segregate the final amended soils by batches based on the expected end use of the amended soils as described in section 5.5.2 below. Each amended soil batch stockpile will range from approximately 2,500 tons to a maximum of 4,000 tons. CENC will mark and designate each amended soil batch based on the end use to ensure that the material is appropriately documented and tracked using the facility's computerized waste tracking system.

When the batch is completed, or closed, CENC will prepare the pile for final sampling to determine whether the end product specifications as described in 5.5.2 are met. Once the batch is designated as complete, no further additions will be made to the batch unless authorized by the General Operations Manager. If the batch is reopened and further additions are made, any prior sampling or analysis that may have been completed are considered invalid and the pile will be resampled.

The sampling of the completed batch will be conducted using a stratified random sampling methodology. Accordingly, CENC will divide the final amended soil batch into nine grid sectors using an imaginary grid overlay as shown in Figure 5-2. A random grab sample will be collected from each grid sector using a stainless steel auger, sampling trowel, trier or other appropriate sampling device (disposal sampling equipment may be used for collection of the grab samples, such as plastic scoops). CENC will record the randomly selected sampling depth within each grid sector using the form shown in Appendix VI of the facility's General Operations Plan. Following collection, each grab sample aliquot from

the individual grid sectors will be combined and mixed in a stainless steel bucket or mixing bowl in the plant laboratory to generate a homogenous mixture from which one composite sample will be obtained for analysis. The composite sample will be extracted from the mixture and submitted for analysis as indicated in 5.5.2 below. The stainless steel bucket or mixing bowl will be decontaminated between uses.

5.5.2 AMENDED SOIL ANALYTICAL TESTING REQUIREMENTS

The final composite sample, collected in accordance with Section 5.5.1 above, of each batch of the amended soils processed by CENC will be analyzed in accordance with testing schedules specified in Appendix V of the General Operations Plan These Schedules address the applicable constituents of concern and maximum concentration limits that will be applied to the amended soils based on the intended end use of the soils. Since these analytical standards are based on the intended end use of the amended soil, the final testing criteria are not dependent upon the specific NHRMs that are blended with the soils, except for a few specific compounds that are only associated with certain NHRMs (e.g., fecal coliform testing is included when biosolids are used).

CENC will limit the use of the final amended soils to industrial and commercial land applications (no residential usages will be approved). Provided below is a summary of the proposed end uses for the amended soils and the corresponding analytical standards that will be applied.

End Use	Applicable Testing Schedule
1) Compost plant feed, landscaping applications and/or landfill top or final/construction cover.	➢ Schedule 1 of Appendix V of the General Operations Plan
2) Construction material, road sub-base, structural and non-structural fill, and landfill top or final construction cover	➢ Schedule 2 of Appendix V of the General Operations Plan (in addition to any applicable requirements in the receiving facility's permit)

3) Landfill operating cover (daily/intermediate), asphalt plant feed	➢ Schedule 3 of Appendix V of the General Operations Plan (plus any applicable requirements specified in the landfill permit in addition to any applicable requirements in the receiving facility's permit)
4) Out-of-State reuse as soil substitute	➢ Meet applicable requirements of the implementing receiving state's reuse conditions

As indicated above, Schedule 1 of Appendix V of the General Operations Plan references the standards that will be applied when the amended soils will be reused as a topsoil supplement for commercial sites where access is limited or industrial sites (as compost plant feed or in landscaping applications). The selection of the list of constituents that will be analyzed in the amended soil is based on the parameters that both Delaware and EPA use in identifying possible sites for inclusion under their respective hazardous site cleanup programs (i.e., the Delaware HSCA program or EPA's CERCLA or "Superfund" program). Specifically, the list includes HSCA's Target Analyte List (TAL) of metals and the Target Compound List (TCL) of organic compounds. Please note that the Schedule does not include all of the TCL volatile organic compounds (VOC's) since these compounds will be treated by the high temperature thermal desorption process. The Schedule does include testing for benzene, toluene, ethyl benzene and xylene as marker compounds. These compounds were selected because they are the most common VOC's that are present in the incoming wastes at CENC and their boiling point ranges match the range of boiling points that are associated with the compounds included in the TCL VOC list (although certain chlorinated TCL compounds may have higher boiling points than the marker compounds selected, these compounds are accepted at CENC and may only be present in de minimis quantities that are already meets end users criteria). Accordingly, if these compounds are being effectively driven off during thermal processing, it can be predicted that the entire range of the TCL VOC's are being effectively treated. This Schedule also includes other general analytical parameters, such as pH and PCB's. In all cases, CENC will continue to monitor TPH concentrations within the final soils after every three hundred tons to determine the effectiveness of the thermal treatment process. All of the constituents identified in Schedule.1 will be compared to the SIRS screening limits for for soils used in surface applications under the restricted use provisions previously discussed. These standards provide the highest level of protection to

human health and the environment for soils in restricted use under the HSCA Guidance Document.

Schedule 2 of Appendix V of the General Operations Plan applies when the amended soils are used as construction material, road sub-base, structural and non-structural fill or as the final construction cover for the top of a landfill. Since the risk of exposure to human health and the environment is reduced in these types of reuses. As with Table 5.1, if biosolids are included in the NHRMs mixed with the thermally remediated soils, then the Part 503 standard will apply. Schedule 2 also includes the same constituents of concerns identified in Schedule 1 for the reasons discussed above.

Finally, Schedule 3 of Appendix V of the General Operations Plan will be applied for amended soils that will have applications such as landfill intermediate or daily cover or as a feed soil for an asphalt feed plant. The SIRS reporting limits will be applied in this case.

6.0 Construction Schedule

The Construction and installation of the NHRM processing equipment and storage areas will be completed in phases as identified below:

Pre-construction
Phase I – Solids & liquids
Phase II – Semi-solids
Post-construction

A detailed schedule for each phase of the construction is outlined in Table 6-1. The following sections are intended to supplement the information provided in this Table.

6.1 Pre-Construction

CENC shall notify the Department in writing at least 30 days prior to beginning Pre-construction activities related to each phase of construction. Pre-construction shall consist of contacting potential suppliers and obtaining price quotes, value evaluation documentation, and item/service availability. After an evaluation period used to review the contractors submittals, CENC will produce an operations schedule to include the time period required to complete the following installations related to Phase I:

1. Pad and containment construction for the tank storage
2. Installation of storage tanks
3. Clearing and decontamination of the storage area for the solid NHRM's
4. Installation of new NHRM feed hopper and conveyor system for solid NHRM's
5. Installation of pipes and pumps for the WBW materials
6. Creation of a new version of our material tracking systems for NHRM's

Likewise, CENC will perform similar pre-construction activities and schedule development related to the initiation of Phase II of the construction/installation plan.

6.2 Phase I

Phase I shall be further divided into two sub-phases for construction – Phase IA and IB. Sub-phase IA, as described in 6.2.1 below, is designed to construct and install the necessary apparatus required to manage solid NHRM's. Sub-phase IB, as described in 6.2.2, is designated to construct and install the necessary appurtenances required to manage liquid (WBW) NHRM's.

6.2.1 Phase IA - Solids

This portion of Phase I will handle the introduction of solid NHRM's into the process. It shall consist of dedicating a storage area strictly for the storage and handling of solid NHRM's. The existing Quonset Hut storage area shall be cleaned and decontaminated to prepare for the management and storage of the solid NHRM's. The facility will also install a new NHRM feed hopper and conveyor system to deliver the solid NHRM's to their insertion point in the mixer/cooler unit of the SRU for the soil amendment process. Refer to the Process Flow Diagram: SWP – Solid Wastes Processing in Appendix I.

6.2.2 Phase IB - Liquids (WBW)

This portion of Phase I will handle the introduction of liquid NHRM's into our process. Phase IB will consist of obtaining storage tanks of third party design and fabrication. The tanks will then be placed on a pad with loading and containment, also of third party design (refer to the attached Site Plan drawings included in the Engineering Report in Section 5 of this permit application). This construction/installation shall include any ancillary pumps and piping required. Material from the tanks shall be transferred to the point of utilization (refer to the Process Flow Diagram: WWP – Water-bound Wastes Processing in Appendix III via a separate self -contained piping system as designed and indicated in the attached drawing number SP1 from Busch Engineering found in Appendix I of the General Operations Plan.

6.3 Phase II - Semi-Solids

Phase II will include the introduction of semi-solid NHRM's into the soil amendment process. It shall consist of a designated receiving and containment area (refer to the Process Flow Diagram: SSWP – Semi-Solid Wastes Processing in Appendix II and the Site Plan in Appendix I of the General Operations Plan). CENC will install a new live bed NHRM feed hopper system to be used as a mixing blending unit for combining solid NHRM's with semi-solid NHRM's prior to the delivery of these materials to the mixer/cooler unit of the SRU. The hopper system is a self-contained unit that requires only placement and an electrical supply for operation. The CENC maintenance department will install this equipment.

6.4 Post Construction

Upon completion of each phase of construction, CENC will notify the Department in writing. CENC will include an independent Professional Engineer certification attesting to the construction/installation of the new equipment. The Department will then perform an inspection to ensure construction is complete per the approved construction plan. No NHRMs may be accepted until the Department has performed this inspection and provided CENC with written approval to proceed. Once the initial NHRM' s have approved waste codes, CENC will begin approving and receiving materials from generators into the newly constructed units. CENC will notify the Department at least two weeks in advance of when the first jobs are scheduled to be received and processed so the Department can observe the new processes.

7.0 Emergency Response and Contingency Procedures

See Appendix VIII of the facility's General Operations Plan.

N:\#0150 - CLEAN EARTH INC\Project #0150-0799-02\CENC Facility\Solid Waste Permit Renewal 2015\Operations Plan and Operating Modules\Operations Plan Revisions Nov 2016\Module 2 NHRM Rev November 2016.doc

Operating Module 3

Management Procedures for Biological Remediation Soils ("BRS")

Operating Module 3 - General Operations Plan for Biological Remediation Soils ("BRS")

November 2016

Document Control Number: DCN-CEI-

Clean Earth of New Castle, LLC
94 Pyles Lane
New Castle, DE 19720

Prepared by:
Compliance Plus Services, Inc.
P.O. Box 186
Hatboro, PA 19040-0186
Ph: (215) 734-1414
Fax: (215) 734-1424

Project Number: 0150.0799.02

Table of Contents

APPENDICES:

Operating Module 3 –

Management Procedures for Biological Remediation Soils ("BRS")

1.0 GENERAL OPERATING PROCEDURES FOR BIOLOGICAL REMEDIATION SOILS

Clean Earth of New Castle, LLC ("CENC") has developed this Operating Module (Module) to describe the procedures and processing practices that will be used to treat and recycle petroleum contaminated soils using biological remediation (or bioremediation) as a method to reduce petroleum hydrocarbons in the soil to levels suitable for beneficial reuse. This process is intended to supplement CENC's existing thermal remediation process to provide an alternative method of soil recovery that uses less energy and does not produce substantial emissions. Petroleum hydrocarbon contaminated soils that are determined to be suitable for processing in this manner are referred to herein as biological remediation soils ("BRS" or "BRS soils"). CENC, along with its affiliate companies, have a long-standing history in the movement and removal of soils at various sites throughout the mid-atlantic region. For the most part, these soil removal actions are related to the remediation of petroleum contaminated soils that have resulted from spills or past industrial uses. Although CENC has relied on thermal remediation as a robust and effective process to remediate and recover soils, many soils may be amenable to bioremediation where naturally occurring microbes, that have been engineered to digest the long chain petroleum hydrocarbons, are used to reduce contaminants in soils and make them suitable for reuse.

1.1 Introduction and Proposed New Operations

This Operating Module has been prepared to describe the proposed operations to be conducted at the CENC facility as part of a modification to its existing resource recovery operations performed under Solid Waste Permit No. SW-02b16.

CENC is currently permitted to handle petroleum hydrocarbon contaminated soils (TPH soils) in its Soil Remediation Unit (SRU). The SRU has been in operation since 1992 and has treated millions tons of contaminated soil for beneficial reuse as intermediate and daily landfill cover and/or structural fill products.

CENC plans to treat some of the petroleum contaminated soils received at the facility using the facility's biological remediation process. This process consists of an accelerated bio-augmentation procedure to introduce specifically engineered microbials and a fertilized blend (see an example Material Safety Data Sheet in Appendix III) into the soil matrix. The process is intended to reduce the petroleum hydrocarbon contaminants present in the soils to produce a final soil/fill material that is suitable for beneficial use. The biological remediation process is described in further detail in Section 2.4.

1.2 Proposed New Processes

The proposed Biological Remediation Soils (BRS) process will enable the facility to:

a) Use bioremediation as an alternative to its existing SRU process and to augment CENC's production of recovered soils to meet an increasing demand and stabilize the facility's inventory.

b) The proposed biological treatment process will allow the facility to continue to process petroleum contamination soil as an alternative backup system in case the SRU is off-line for routine repairs or modifications.

c) The use of bioremediation as an alternative to thermal treatment will help to reduce the facility's overall emissions and reduce its reliance on natural gas or alternative fuels during peak demand events.

d) Maximize operations (principally utilizing existing equipment) to serve a broader range of customers, and will enhance CENC's ability to compete in an ever increasingly competitive marketplace.

1.3 Equipment

CENC will utilize its existing equipment for the handling and screening of BRS soils managed at the site. An equipment list is provided as Table 1-4 of the General Operations Plan that details the current assets utilized at the facility. In addition to this equipment, CENC proposes to install an Application System which will enable the facility to apply a metered amount application of the biologically enhanced microbial agent product to the soil. An example diagram of a sample Bulk Bag Application System is provided in Appendix I of this Module which shows one suitable system that can handle and apply the microbial agents/fertilizer mixture that are routinely received in "super sack" bags. This is an example of one type of Bulk Application system CENC will select a similar or equivalent model for actual installation. Prior to installation of the Bulk Bag Application System, the biologically enhanced remediation materials will be applied manually and mixed into the BRS soils using existing heavy equipment. The proposed location of the Application System is presented on the Site Plan, Drawing No. SP-01, prepared by CPS, dated August 24, 2015 (see Appendix I of the GOP).

1.4 Health and Safety

The management of BRS Soils and the processes that will be added under this permit modification are not expected to present any additional or new hazards to the health and welfare of CENC's facility employees or the surrounding community.

2.0 MATERIAL APPROVAL AND ACCEPTANCE

2.1 Material Acceptance

Each source of incoming soils destined for the CENC facility will undergo a pre-approval review process and pre-acceptance testing as outlined in Section 3.0 of the General Operations Plan. Following review of the analytical and associated pre-approval documents, incoming soils will be further examined to determine the physical characteristics of the soil. If following review by the facility's Operations Manager or his/her designee, both the chemical and physical characteristics of the incoming soil are determined to be of the nature amenable to biological remediation, the material will be accepted for the BRS process. An example of this screening process is that microbial decomposition of petroleum compounds in soil is maximized when the soil conditions or characteristics are optimized such as moisture levels, porosity and organic content, to promote aerobic digestion. For example, a fine clay material does not lend itself to the bioremediation process, while a loamy soil can efficiently be remediated via the biological remediation process and is better suited for thermal treatment.

Once an incoming material is determined to be acceptable for the bioremediation process, the material will be placed in storage. Storage of BRS soils will primarily be in Building B, however, due to operational demands and inventory at the time of receipt, the material may be stored in other storage buildings so long as it is segregated from other soils.

2.2 Inspection and Unacceptable Material Rejection

Authorized personnel from the CENC facility will inspect and sample incoming loads as outlined in the General Operations Plan Sections 3.3, Incoming Load Verification and Section 2.2.2, Visual Inspection/Load Rejection. Procedures as described in the above sections will be implemented for BRS soils.

All soils received at the facility are accompanied by appropriate shipping documents to confirm delivery of the material. Each incoming shipment is also tested in accordance with procedures outlined in Section 3.1 of the facility's General Operations Plan for TRS soils and logged into the facility's computerized tracking system and placed into inventory.

2.3 Material Storage

CENC will use existing facility space for receiving, storing and sorting/screening and treatment of the incoming soils suitable for the biological treatment process. CENC will primarily use Building B for the storage and stockpiling of bioremediation process soils. The Building will be utilized after initial screening to store the material and to remove any aggregates and debris from the incoming soils when they are first received. The storage bays will be segregated using jersey barriers, portable concrete push walls, or other similar devices. Portable walls will be used to form the stockpile areas, the walls can be moved to allow the facility to change size of the stockpile footprint as needed. Accordingly, the storage bays may differ in size depending upon the amount of soils stockpiled at any particular time. This affords the facility the flexibility to provide an additional treatment process that achieves the same level of contaminate reduction as does the SRU process, in the event that the SRU process is off line for maintenance or other reasons.

Shipments of incoming soils are weighed on the facility's scale and subsequently directed into the appropriate storage building based on operating conditions at the time the soil is received.

The inbound unprocessed BRS soils are placed in one of the Unprocessed Storage Areas primarily located in Building B and segregated from other materials. The facility will routinely treat incoming soils in treatment batches of 1,200 tons. Following the treatment process treatment batches can be mixed into process batches of 2,500 – 4,000 tons of treated soils for post treatment sampling and analysis as described in section 3.2 below.

Building B had previously been removed from services due to roof damage, however, the unit will be repaired prior to being placed back into service as described in Section 5, Engineering Report of this application. Building B will be used to primarily handle the processing and storage of BRS soils and limited pre-approval testing.

2.4 Process Description

Once acceptance of the material has been determined to be appropriate for the bioremediation process, the soils brought into the facility will be offloaded primarily into Building B (see Site Plan, Drawing No. SP-01, dated August 24, 2015 in the General Operations Plan for TRS soils).

The contaminated soil is received through the normal receiving process, then it is screened through a screener (see Appendix I, Process Flow Diagram). Large debris and aggregate that are screened from the soil are segregated and sent off site for recycling.

The BRS soil then has the microbial reagents applied by means of a front end loader and thoroughly mixed. The microbial reagents may also be applied during the screening process. An MSDS for the microbial agents is provided in Appendix III. The soil is then transferred by means of a large front end loader to primarily Building B for storage during the biological process. The materials may be stored in other onsite building as

long as the material is segregated. The BRS soils may be transferred between the storage buildings during the process as needed to facilitate mixing and operational demands at the time of processing.

After screening and the application of the facility's microbial treatment reagent, the processed soils are moved primarily into the Processing Area of Building B where the microorganisms in the soils are permitted to amplify and remediate the petroleum contaminants, but can be stored for treatment in other Buildings as needed. As detailed in Section 2.3 above, the facility will monitor the in-process treatment batches to ensure that the end use criteria are achieved. Periodically, the treated batch may be rotated and moved to another storage building so long as it is segregated during the BRS process or rotated within the Processing Area to aerate the piles and maintain a suitable level of biological activity. This aeration is used to facilitate the effectiveness of the treatment and help reduce the residence time to complete the remediation process.

CENC will also sample and test, on an as needed basis, treated soil batches throughout the entire treatment/recycling process. These samples will be tested for various indicators of the treatment evolution and process timing that may include, but are not necessarily limited to, total petroleum hydrocarbon (TPH) contaminant levels, specific trace element and nutrient levels. These samples will be taken at a frequency distribution as dictated by the characteristics of the soil materials, the amount of contaminant reduction required and the rate of remediation. These samples will, on a case by case basis, be tested either at the onsite laboratory facilities or sent out for independent testing by a third party laboratory. All post treatment analysis will be done in accordance with the Schedules 1, 2 and 3 of the General Operating Plan, Appendix V.

2.5 Final Beneficial Reuse Materials

The biologically treated soil can be used in a variety of applications, including: landfill daily or intermediate cover, structural fill, road base aggregates, or aggregates used in production of road construction materials such as hot mix asphalt or Portland cement

concrete. These materials will supplement CENC's existing remediated soil supply obligations that are already being sent to the landfills for reuse.

Any reuse of the biologically treated soil as road base aggregate, structural fill or fill materials outside of landfills will be conducted on a case by case basis, with prior written approval from the Department.

3.0 WASTE ANALYSIS AND CHARACTERIZATION PLAN

3.1 Approval Process and Testing

BRS soils will be received in the same way that all incoming soils are brought into the facility and in accordance with CENC's approval process as described in Section 3.1 of the General Operations Plan. The analytical testing that will be required to be completed for each new source of BRS Soils is summarized in Table 3-1of the General Operations Plan for TRS soils.

CENC uses a comprehensive material analysis and approval process to document the origin and type of contaminants in the soils received at its facility prior to acceptance in order to verify the materials meet conditions of the facility's permit and can be processed at the facility. This process also allows CENC to track the soils from receipt, through processing, to when the soils are rendered suitable for reuse. CENC processes and treats the soil in batches so the facility can manage and predict the physical and chemical characteristics (e.g., soil porosity, grain size, TPH level, etc.) of the final soil products produced. Process controls enable the facility to produce a consistent recycled soil product that is suitable for beneficial reuse purposes, including, but not limited to, Alternate Daily Cover ("ADC") at operating sanitary landfills.

3.3 Post-Treatment Soil Sampling and Analysis

CENC conducts post-treatment sampling and analysis which will ensure each treated batch of biologically treated soil is adequately tested to verify that the chemical and geotechnical characteristics of the batch satisfies the criteria for the specific end use specified in the Post Process Soil Analytical Testing Schedule included in Appendix V or the GOP.

Once the final analysis is complete and the soils meet all analytical requirements, the processed soils may be either shipped directly offsite for final reuse or the material may be mixed with the thermally remediated soils (that have already been tested and determined to meet the reuse criteria)/or drying agents to produce a final product that is acceptable for reuse. Mixing with the thermally treated soils/or drying agents is principally conducted to meet the geotechnical requirements for the intended reuse, such as providing a consistent particle size for the landfill cover.

4.0 CONSTRUCTION SCHEDULE

Building B had previously been removed from services, but will be rededicated to handle the processing and storage of BRS soils. A construction schedule for refurbishing Building B will be submitted to DNREC following the approval by DNREC of the biological treatment process.